

**SUPPLEMENTAL SPECIFICATIONS
FOR 2012 IDAHO STANDARD SPECIFICATIONS FOR HIGHWAY CONSTRUCTION**

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SUPPLEMENTAL SPECIFICATIONS

ON PAGE 4, SUBSECTION 101.03- ABBREVIATIONS AND ACRONYMS

Add after the 10th item:

CRD - United States Corps of Engineers Controller of Research and Development

ON PAGE 10, SUBSECTION 101.04- DEFINITIONS

Add the following in alphabetic order:

Roller Coverage - the rolling of the entire width one time, including roller overlap.

Roller Pass - the passing of the roller over an area (roller width) one time.

ON PAGE 13, SUBSECTION 102.03- EXAMINATION OF PLANS, SPECIFICATIONS, AND SITE OF WORK

Add after the first paragraph:

Upon request, the Department will provide electronic design data to the bidder. The electronic design data is provided for bidder convenience and information and will not become part of contract. No guarantee or warranty is made by the Department that the electronic design data provided to the bidder is compatible with any of the systems that are used by the bidder, is complete, is representative of actual conditions at the site of work, or accurately reflects the quantities and character of the actual work required. The furnishing of electronic design data does not relieve the bidder from risks or of duty to make examinations and investigations of the site of work or of other responsibilities.

ON PAGE 14, SUBSECTION 102.04- EXAMINATION OF PLANS, SPECIFICATIONS, AND SITE OF WORK

*

Add after the first partial paragraph:

E-bid using the Department provided program (Expedite). The Department allows multiple combinations of bidding, consisting of combinations of electronic and hard copy documents.

Electronic bidding program “amendments” are the equivalent of Addenda in the bidding of Department projects. Electronically acknowledge addenda by inclusion of corresponding amendment files.

The “No Bidding Errors” statement provided by the electronic bidding program’s output, in the summary of bids, is a verification of all fields provided in the E-bid having an entry made. It does not mean that the information provided is correct, acceptable, or complies with requirements or specifications.

ON PAGE 28 & 29, SUBSECTION 105.02- PLANS AND WORKING DRAWINGS

*

Delete the first sentence of the third paragraph and substitute the following:

Submit working drawings to the Engineer in pdf format. Include on each drawing and calculation sheet the project name as shown on the plans, District-County-Route, bridge number, contract number, contract drawing number, and key number.

Delete the first sentence of the fourth paragraph and substitute the following:

For structures, submit working drawings in pdf format that include the following:

Delete the last paragraph and substitute the following:

Before completion of the project, provide as-built working drawings in pdf format for any permanent part of the completed structure.

ON PAGE 29, SUBSECTION 105.04- COORDINATION OF CONTRACT DOCUMENTS

Delete numbered paragraphs 1 through 6 and substitute the following:

1. Calculated dimensions govern over scaled dimensions.
2. Plan sheets govern over Standard Specifications, supplemental specifications, standard special provisions, and standard drawings.
3. Plan details govern over general notes.
4. Supplemental specifications govern over Standard Specifications.
5. Standard special provisions govern over Standard Specifications, and supplemental specifications.
6. Special provisions govern over standard special provisions, Standard Specifications, supplemental specifications, and the plans.
7. Details on the bid schedule govern over other contract documents.

ON PAGE 30, SUBSECTION 105.07- UTILITY FACILITIES

Add the following after the first sentence of the second paragraph:

The Engineer will immediately notify the utility that an unidentified utility facility has been discovered.

Delete from the second sentence of the second paragraph:

“The Engineer will”

ON PAGE 55, SUBSECTION 105.19 - ALTERNATE RESOLUTION PROCESSES

*

Delete the first sentence of the last paragraph of part 5 and substitute the following:

The Department and Contractor will pay each DRB member for actual time spent at the rate of \$185 per hour with a maximum of \$1,500 per day.

ON PAGE 56, SUBSECTION 105.19 - ALTERNATE RESOLUTION PROCESSES

*

Delete the first sentence of the first paragraph of part 5 and substitute the following:

The Department and Contractor will pay each DRB member for actual travel time to and from DRB meetings at the rate of \$75 per hour with a maximum of \$300 each way.

ON PAGE 62, SUBSECTION 106.01- SOURCE OF SUPPLY AND QUALITY REQUIREMENTS

Add the following:

For projects that involve federal-aid funding, ensure all steel or iron materials permanently incorporated into the work has been produced in the United States. All manufacturing processes for these materials including the application of coatings for such materials must occur in the United States. Coating includes all processes which protect or enhance the value of the material to which the coating is applied.

Obtain from the manufacturer, certifications which document that steel and iron have been manufactured and that coatings for iron or steel have been applied in the United States. Provide the required certifications to the Engineer prior to incorporating these materials into the work. The Department will also require certifications for manufactured and fabricated products purchased by the Contractor.

Provide certifications conforming to 106.04.

The Engineer will permit small quantities of foreign manufactured material so long as their total cost does not exceed 0.1% of the total contract amount or \$2,500 whichever is greater.

Should foreign steel, iron, or applied coatings for iron or steel in excess of the quantities allowed herein become incorporated into the work, remove such materials in excess of the allowable maximum and replace them with materials complying with these specifications at no additional cost to the Department.

ON PAGE 63, SUBSECTION 106.03- SAMPLES, TESTS, AND CITED SPECIFICATIONS

Delete from the sixth paragraph “technicians” and substitute “individuals”.

ON PAGE 64, SUBSECTION 106.03- SAMPLES, TESTS, AND CITED SPECIFICATIONS

Move first paragraph of 106.03B "For aggregate, the Engineer will use the lowest pay factor computed for any one sieve as the pay factor for that lot." to the new third paragraph position. Retain all text in the Subsection.

ON PAGE 67, SUBSECTION 106.07- TEST RESULT DISPUTE RESOLUTION

Delete the first paragraph and substitute the following:

The Department or Contractor may use dispute resolution when differences between the quality control test results and the acceptance test results exceed the values specified in the Quality Assurance Special Provision (QASP) for the quality characteristics specified in Table 106.03-1 of the QASP.

ON PAGE 91, SUBSECTION 108.03- PROJECT SCHEDULE

Delete from the first 108.03.A.1 "Primavera Suretrack or"

ON PAGE 94, SUBSECTION 108.04- PRECONSTRUCTION OR PREOPERATIONAL CONFERENCES

Add the following after paragraph 2 and renumber 3 to 4.

3. WH-5 Public Works Contract Report

ON PAGE 108, SUBSECTION 109.02-SCOPE OF PAYMENT

*

Add the heading A. **General** before the current text.

Add the following:

B. **Price Adjustment.** The Department will consider progress estimate adjustments to applicable contract item costs as a payment to the Contractor or a credit to the Department, when the indexes change as defined for asphalt and fuel. On the first Monday for each month the Department will publish a Current Asphalt Index (CAI) based on the previous four week average as reported by Poten & Partners, Inc. for Boise Area and a Current Fuel Index (CFI) based on the price of ultra-low sulfur, clear, diesel #2 fuel, as reported in Oil Price Information Services. The Base Asphalt Index (BAI) and the Base Fuel Index (BFI) for the contract will be the last posted index amount preceding the bid opening date. A payment to the Contractor may be applied, or a credit to the Department may be deducted from any sums due the Contractor to each effected progress estimate. Work performed at no expense to the Department will not be eligible for an adjustment.

1. **Computing the Asphalt Price Adjustment.** A price adjustment will be made only when the CAI varies by more than 10 percent from the BAI, and only for that portion of the variance in excess of 10 percent. Credits and payments are computed as follows:

a. The tons of asphalt used during each progress estimate period will be computed for applicable contract items.

The plant mix asphalt quantity used, when the item includes asphalt and additives, will be calculated at the approved contractor job mix formula (C-JMF) percentage. Asphalt

cement contained in RAP is not eligible for a price adjustment. Only virgin asphalt cement in the mix will be eligible for APA.

The APA for emulsified asphalt products will be calculated based upon the percent asphalt in the emulsion, which is estimated at 65% (32.5% for diluted emulsion) unless otherwise specified.

- b. The total asphalt tons used for each progress estimate period will be summed for the applicable contract items.
- c. The APA credit or payment is computed from the following formula:

Contractor Payment if CAI is greater than 110% of BAI:

$$\text{APA} = (\text{CAI} - 1.10 \text{ BAI}) (\text{Q})$$

Department Credit if CAI is less than 90% of BAI:

$$\text{APA} = (\text{CAI} - 0.90 \text{ BAI}) (\text{Q})$$

Where:

APA = Asphalt Price Adjustment in dollars

BAI = Base Asphalt Index

CAI = Current Asphalt Index

Q = Total tons of asphalt used for the progress estimate.

If the CAI increases by 50 percent or more over the BAI, the Department will determine the feasibility of continuing construction of the project. The Engineer will notify the Contractor in writing if the Contract will be terminated per 108.10. This adjustment will be applied only for material that is accepted and allowed to be left in place.

- 2. **Computing the Fuel Price Adjustment.** A price adjustment will be made only when the CFI varies by more than 20 percent from the BFI, and only for that portion of the variance in excess of 20 percent. Credits and payments are computed as follows:

- a. The Engineer will obtain the work quantity performed from the progress estimate for the applicable contract items based on the categories in table 109.02-1.
- b. Compute the fuel usage for each applicable contract item by multiplying the fuel usage rate by the work quantity performed for each item.
- c. Sum the total fuel usage in gallons (Q) for the applicable contract items.
- d. Compute the FPA credit or payment using the following formulas:

Contractor Payment if CFI is greater than 120% of BFI:

$$\text{FPA} = (\text{CFI} - 1.20 \text{ BFI}) \times \text{Q}$$

Department Credit if CFI is less than 80% of BFI:

$$\text{FPA} = (\text{CFI} - 0.80 \text{ BFI}) \times \text{Q}$$

Where:

FPA = Fuel Price Adjustment in dollars

BFI = Base Fuel Index

CFI = Current Fuel Index

Q = Total gallons of fuel used for the progress estimate

When the work under the contract is completed, the Engineer will determine any difference between estimated quantities and final quantities for each applicable work item. Calculate an average CFI of the CFI's from individual pay estimates to which a FPA was applied. Calculate the FPA for the fuel usage obtained from the difference between the estimated and final applicable contract item quantities. A final FPA will be paid or deducted on the final estimate.

Table 109.02-1
Fuel Usage Rates

Item Category Description	Rate: Gal/Unit
Excavation including topsoil	0.29 / CY
Excavation – Rock (must be specifically identified as such in contract)	0.39 / CY
Borrow	0.29 / CY
Base	0.63 / Ton
Surface treatments including sealcoats	0.02 / SY; 1.47 / Ton
Concrete Pavements	0.03 / SY / inch of depth
Concrete (all concrete paid by the CY)	0.98 / CY
Plantmix pavements	2.6 / Ton
Piledriving	0.12 / FT
Rotomilling	0.02 / SY
Pulverizing / Mixing	0.02 / SY plus 0.015 / SY /foot of depth
Pilot / Pace Car, pipe, guardrail	19.0 / \$1000
MSE Retaining Wall	19.0 / \$1000

ON PAGE 108, SUBSECTION 109.03-PAYMENT FOR QUANTITY VARIATIONS, CONTRACT REVISIONS, AND DELAYS

Delete “for Force Account Work” from first sentence of third paragraph of Part A.

ON PAGE 113, SUBSECTION 109.03-PAYMENT FOR QUANTITY VARIATIONS, CONTRACT REVISIONS, AND DELAYS

Delete paragraph 109.03.C.5.d.

ON PAGE 114, SUBSECTION 109.03-PAYMENT FOR QUANTITY VARIATIONS, CONTRACT REVISIONS, AND DELAYS

Delete the operated rate formula from 109.03.C.5.f.2) and substitute the following:

$$HR = \frac{(MR + AT) \times RA \times RF}{MH} + OC$$

ON PAGE 115, SUBSECTION 109.03-PAYMENT FOR QUANTITY VARIATIONS, CONTRACT REVISIONS, AND DELAYS

Delete the standby time formula from 109.03.C.5.f.3) and substitute the following:

$$HR = \frac{(MR + AT) \times RA \times RF}{MH} \times 0.5$$

Delete the last paragraph of 109.03.C.5.f.4) and substitute the following:

If the invoice rental rate does not include fuel, lubricants, repair, and servicing costs, the Department will pay the Blue Book published hourly cost from the column marked "Estimated Operating Costs" for the hours operated.

For equipment not found in the Blue Book and when the invoice rental rate does not include fuel, lubricants, repair, and servicing costs the Department will pay an additional 15% of the invoice rental rate.

ON PAGE 123, SUBSECTION 109.08 - ACCEPTANCE AND FINAL PAYMENT *

Add to the second Paragraph:

Provide a consent of surety letter with the wording; "As Surety for the above referenced project that has previously issued a performance bond pertaining thereto, and in accordance with Idaho Code and the Standard Specifications for Highway Construction, Surety agrees and guarantees under said performance bond, to promptly repay the Idaho Transportation Department for any over-payments made to Surety's principal and any tax claims made pursuant to Title 63, Chapter 15, Idaho Code", signed by the Attorney-In-Fact for Surety, to the Engineer.

ON PAGE 128, SUBSECTION 205.01 - DESCRIPTION *

Delete in 205.01 C 2 Rock Embankment "205.03.E" and substitute "Table 205.03-1 Class A Compaction".

ON PAGE 130, SUBSECTION 205.03 - CONSTRUCTION REQUIREMENTS *

Delete the second paragraph of Part D and replace with the following:

Remove and dispose of unsuitable soft spot material. The Department will pay for approved replacement materials.

ON PAGE 132, SUBSECTION 205.03 – CONSTRUCTION REQUIREMENTS

Decrease the indent of Part "3. Density Determination" so that it is 205.03.E.3, aligning with Parts 1 & 2 on page 131.

Delete from listed test AASHTO T 99 Method A or C the words "A or".

ON PAGE 133, SUBSECTION 205.03 – CONSTRUCTION REQUIREMENTS

Delete the Material Property in row b of Table 205.03-1 and substitute "less than 10% retained on the 3 in. sieve; and less than or equal to 30 percent retained on the 3/4" sieve

ON PAGE 153, SUBSECTION 212.03 – CONSTRUCTION REQUIREMENTS

Add to 1st paragraph of Part A:

Refer to the ITD Erosion and Sediment Control Best Management Practices and the Standard Drawings (P series) for appropriate selection and installation guidance.

Delete the 2nd and 3rd sentences in 3rd paragraph of Part A and substitute the following:

Complete installation of erosion and sediment control measures on erodible surfaces, regardless of size, within 5 calendar days. The Engineer may extend this time period 5 additional calendar days when working in arid and semi-arid areas during the seasonally dry period and when NOAA (National Weather Service) forecasts indicate there is little chance of precipitation.

Add to 3rd paragraph of Part A:

No more than 5 acres of disturbed soil may be unstabilized on a project at any given time, unless otherwise approved by the Engineer.

ON PAGE 154, SUBSECTION 212.03 – CONSTRUCTION REQUIREMENTS

Delete the last two paragraphs of Part 212.03.B.3 and substitute the following:

Remove silt fence for final acceptance unless otherwise directed by the Engineer.

ON PAGE 156, SUBSECTION 212.03 – CONSTRUCTION REQUIREMENTS

Delete from the first full paragraph “Inlet Protection.” and substitute Heading “ **12. Inlet Protection.**”

ON PAGE 157, SUBSECTION 212.03 – CONSTRUCTION REQUIREMENTS

Delete the title of Part 212.03.C.1 and substitute the following:

1. Seeding, Rolled Erosion Control Products (RECPS), Turf Reinforced Mats (TRM) and Mulching

Delete the Third paragraph of Part 212.03.C.1 and substitute the following:

Install RECPS, TRMs, mulch, and hydraulically applied erosion control products as specified in 621.03.E and 621.03.F.

ON PAGE 158, SUBSECTION 212.04- METHOD OF MEASUREMENT

Delete “swale,” from the first sentence of 212.04.4.

ON PAGE 159, SUBSECTION 212.05- BASIS OF PAYMENT

Delete the Third paragraph and substitute the following:

The Department will pay for seeding, Rolled Erosion Control Products, Turf Reinforced Mats, mulching, hydraulically applied erosion control products, and other seeding items under the appropriate contract pay items of 621.

ON PAGE 183 TO 222, SECTION 405- SUPERPAVE HOT MIX ASPHALT

*

Delete this Section and substitute the following:

SECTION 405 - SUPERPAVE HOT MIX ASPHALT

405.01 Description. Construct one or more courses of Superpave Hot Mix Asphalt (HMA) plant mix, including leveling courses if applicable, on a prepared surface. Unless specifically indicated otherwise, references in this section also apply to Warm Mix Asphalt, (WMA).

405.02 Materials. Provide Superpave HMA composed of a combination of aggregate, approved additives, mineral filler (if required), Recycled Asphalt Pavement (RAP) (if used), warm mix asphalt additives or process, and performance graded (PG) asphalt binder material. Furnish a job mix formula (JMF) and a Superpave HMA pavement that complies with the requirements of Section 405, 703, and 720.

Table 405.02-1 - Superpave Mixture Requirements

Mixture Type	SP2 (50 gyrations)	SP3 (75 gyrations)	SP5 (100 gyrations)
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Design ESALs ^a (millions)	< 1	1 < 10	≥10
Gyratory Compaction			
Gyrations for Nini	6	7	8
Gyrations for Ndes	50	75	100
Gyrations for Nmax	75	115	160
Relative Density, %Gmm@ Nini	≤ 90.5	≤89.0	≤89.0
Relative Density, %Gmm@ Ndes	96.0	96.0	96.0
Relative Density, %Gmm@ Nmax	≤98.0	≤98.0	≤98.0
Air Voids, % V _a	4.0	4.0	4.0
Dust to Binder Ratio Range ^b	0.6-1.2	0.6-1.2	0.6-1.2
Voids Filled with Asphalt (VFA) Range, ^c Percent	65-78	65-75 ^d	65-75 ^d

- a. The anticipated project traffic level expected on the design lane over a 20-year period. Regardless of the actual design life of the roadway, determine the design ESALs for 20 years.
- b. For No. 4 nominal maximum size mixtures, the dust-to-binder ratio is 0.9 to 2.0. If the aggregate gradation passes beneath the PCS Control Point specified in 703.05, the allowable dust-to-binder ratio range may increase from 0.6 - 1.2 to 0.8 - 1.6.
- c. For 1½ in nominal maximum size mixtures, the specified lower limit of the VFA is 64% for all design traffic levels.
- d. For design traffic levels of > 3 million ESALS, ¾ in nominal maximum size mixtures, the specified VFA range is 73% to 76 % and for No. 4 nominal maximum size mixtures is 75% to 78%.

SP3 mixes approved by the Department may be substituted for SP2 mixes. Use the binder content corresponding to 3.5 percent air voids. Adjust the binder content of the SP3 mix by selecting the binder content that achieves 3.5 percent air voids at 75 gyrations from the binder content vs. air voids graph of the approved mix design and target this binder content in the C-JMF. The SP3 mix will be tested during production and accepted as an SP2 mix, (binder content and gradation) when a substitution is made. Use the VFA value for an SP2 design.

Use an approved anti-stripping additive in all mixtures. Use a minimum one-half percent approved liquid anti-stripping additive by weight of total asphalt or use lime as an anti-stripping additive. Determine the amount of liquid anti-stripping additive or lime required by performing stripping testing during the mix design development. If lime is used as an anti-stripping additive, the Department does not require liquid anti-stripping additive.

Warm Mix Asphalt (WMA). Warm Mix Asphalt (WMA) is defined as HMA that is produced at a target discharge temperature of 275°F or less using approved WMA additives or processes from the Department's QPL. WMA is allowed for use on all projects and is required when shown on the plans. Department-approved WMA additives or processes may be used to facilitate mixing and compaction of HMA produced at target discharge temperatures above 275°F; however, such mixtures will not be defined as WMA.

Use additives or processes from the department's QPL. Follow supplier or manufacturer recommendations for additives and processes when producing WMA mixtures.

Use equipment and WMA technologies capable of producing an asphalt mixture that meet specification requirements and is workable at the minimum placement and compaction temperature desired, regardless of storage or haul distance considerations.

Produce Superpave WMA by one or a combination of several approved technologies from the following categories as on the Departments QPL List:

- Chemical Processes
- Foaming Processes
- Organic Processes

The Department and Contractor shall prepare Superpave WMA field samples, as recommended by the manufacturer's representative, for WMA mixture testing.

Recycled Asphalt Pavement (RAP). The Department will allow Recycled Asphalt Pavement (RAP) (also known as Reclaimed Asphalt Pavement), in the Superpave HMA. Provide RAP as specified in 720.07. Produce the mixture in accordance with 405.03.A when using RAP. Select the mass of RAP included in the mixture, the type of RAP used in the mixture, and the extent of RAP processing necessary to meet the specifications. The Department will not change specifications or the contract unit price if RAP is used in the mixture.

If RAP material is to be used from the project, obtain a representative sample of material for use in the mix design.

The mass of RAP used in Superpave HMA is the mass of asphalt binder, in percent, that the RAP contributes to the total mass of binder in the mixture.

RAP Binder Percentages and Binder Grade Selection. Determine the percentage of RAP used and the binder grade required to meet specifications. Select the percentage of RAP used in the mix by determining the contribution of the RAP binder toward the total binder in the mix, by weight.

It may be necessary to use a softer virgin PG binder than is specified in the contract to compensate for the age hardened binder contributed by the RAP. Adjust the binder grade specified in the contract as needed to account for the stiffening effect of the aged binder in the RAP and that will result in a composite binder that meets the contract requirement. The method for determining the binder grade adjustment in Superpave HMA mixtures incorporating RAP is designated Level 1, Level 2 and Level 3 as shown in Table 405.02-2. Each level has a range of percentages that represent the contribution of the RAP binder toward the total binder, by weight.

Table 405.02-2 - Grade Adjustment for RAP usage

Level	RAP binder by weight of the total binder in the mixture, %	Binder Grade Adjustment to compensate for the stiffness of the asphalt binder in the RAP
1	0 to 17	No binder grade adjustment is made.
2	> 17 to 30	Unless otherwise shown on the plans, the selected binder grade adjustment for the binder grade specified on the plans is one grade lower for the high and the low temperatures designated. or; determine the asphalt binder grade adjustment as shown in Level 3.
3	>30	Determine the selected binder grade adjustment for the asphalt binder using a blending chart for high and low temperatures. Supply the blending chart and the RAP test data used in determining the binder selection to the Engineer. Note: See AASHTO M 323 for recommended blending chart procedure.

Table 405.02-3 identifies the typical binder grades used and the recommended binder grade adjustments for each binder grade at the RAP level described in Table 405.02-2. If the binder grade adjustment is not in Table 405.02-3, use Table 405.02-2 to determine the binder grade adjustment needed.

Table 405.02-3 Typical Adjusted Binder Grades

	Level 1	Level 2	Level 3
Binder grade specified in contract	Adjusted Binder grade	Adjusted Binder grade	Adjusted Binder grade
58-28	No Adjustment is made	52-34	Use Blending Chart to select binder grade.
58-34		52-34	
64-28		58-34	
64-34		58-34	
70-28		64-34	
76-28		70-34	

Use the following equation to determine the percent of RAP by weight of mix:

$$X\% = c(a/b)$$

Where: a = optimum AC content, % in mixture to produce 4.0% air voids

b = % AC in the RAP (from chemical extraction and/or AASHTO T 308 burn)

c = percent of RAP binder by weight of the total binder desired in the mix

X = desired RAP percent by total weight of mix

The following is an example of the calculation:

Total RAP binder desired equals 17% of Total binder in the mixture. If RAP will contribute 5.1% AC and the optimum AC is 5.8% then:

$$X\% = 17\% * (5.8/5.1) = 19.3\%$$

Submittals. Submit virgin and RAP material for Bulk Dry Specific Gravity of Aggregate, Gsb determination for all classes of mix. For Superpave mixtures designated as SP-2, the Department will not require HMA material samples to be submitted for mix design testing. Submit SP-2 mix designs for paper review only. For SP-2 submit a mix design that meets the requirements of 405.03.A, except for the material submittal requirement.

Provide materials as specified in:

Aggregate.....	703
Asphalt.....	702
Anti-Stripping Additive	702
Hydrated Lime	720.06
Recycled Asphalt Pavement (RAP)	720.07

Test materials in accordance with the following applicable standard methods:

Particle Size Distribution of Aggregate	FOP for AASHTO T 27 with
Materials Finer than 75um (No. 200) Sieve	
In Mineral Aggregate by Washing	FOP for AASHTO T 11 Method A or B
Mechanical Analysis of Extracted Aggregate.....	FOP for AASHTO T 30
Preparing and Determining the Density of Hot-Mix-Asphalt (HMA)	
Specimens by Means of the Superpave Gyratory Compactor.	FOP for AASHTO T312

Superpave Volumetric Design for Hot-Mix Asphalt (HMA)	AASHTO R 35
Determining the Percentage of Fracture in Coarse Aggregate	FOP for AASHTO T 335
Method 1	
Percent Air Voids in Compacted Dense and Open Bituminous Paving Mixtures	AASHTO T 269
Theoretical Maximum Specific Gravity and Density of Bituminous Paving Mixtures	FOP for AASHTO T 209
Bowl Method	
Bulk Specific Gravity of Compacted Bituminous Mixtures Using Saturated Surface Dry Specimens	FOP for AASHTO T 166
Method A	
Pavement Straightedge Procedures	Idaho IR-87
In Place Density of Asphalt Mixtures by Nuclear Methods	FOP for AASHTO T 355
Backscatter mode	
Sampling Asphalt Mixtures after Compaction (Obtaining Cores)	FOP for AASHTO R 67
Determining Volume of Liquids in Horizontal or Vertical Storage Tanks	Idaho IT-120
Acceptance Test Strip for Hot Mix Asphalt (HMA) Pavement	Idaho IR-125
Standard Practice for Operating Inertial Profilers and Evaluating Pavement Profiles	AASHTO R 57
Determining the Asphalt Binder Content of Hot Mix Asphalt (HMA) by the Ignition Method	FOP for AASHTO T 308
Sampling Bituminous Paving Mixtures	FOP for AASHTO T 168
(See QA Manual Section 270 for sampling method)	
Reducing Samples of Hot Mix Asphalt to Testing Size	FOP for AASHTO R 47
Moisture Content of Hot Mix Asphalt (HMA) by Oven Method	FOP for AASHTO T 329
Plastic Fines in Graded Aggregate and Soils By Use of the Sand Equivalent Test	FOP for AASHTO T 176
Alternate Method #2, Mechanical, Prewet	
Standard Test Method for Effect of Water on Compressive Strength of Compacted Bituminous Mixtures (Immersion- Compression	ASTM D1075
(Replace D1074 and D2726 with AASHTO T 167 and AASHTO T 168)	
Resistance of Compacted Asphalt Mixtures to Moisture-Induced Damage.....	AASHTO T 283
Uncompacted Void Content of Fine Aggregate, Method A	AASHTO T 304
Mixture Conditioning of Hot-Mix Asphalt (HMA)	AASHTO R 30
Sampling Asphalt Materials	FOP for AASHTO R 66
Determining Rutting Susceptibility of Asphalt Pavement Mixture Using the Asphalt Pavement Analyzer (APA)	AASHTO T 340
Superpave Volumetric Mix Design	AASHTO M 323
Evaluation of the Superpave Gyrotory Compactor (SGC)	
Internal angle of Gyration Using Simulated Loading	AASHTO T 344
Standard Test Method for Flat Particles, Elongated Particles, or Flat and Elongated Particles in Coarse Aggregate	FOP for ASTM D4791
(ratio of length to thickness equal to or greater than 5:1)	
Bulk Specific Gravity and Density of Compacted Asphalt Mixtures Using Automatic Vacuum Sealing Method	AASHTO T 331
Standard Practice for Rapid Drying of Compacted Asphalt Specimens Using Vacuum Drying Apparatus	ASTM D7227
Standard Test Method for Maximum Specific Gravity and Density of Bituminous Paving Mixtures Using Automatic Vacuum Sealing Method	ASTM D6857
Specific Gravity and Absorption of Aggregate Using Automatic Vacuum Sealing Method	Idaho IT 144
Quantitative Extraction of Bitumen from Bituminous Paving Mixtures	AASHTO T 164

Quantitative Extraction and Recovery of Asphalt Binder From Asphalt Mixtures	AASHTO T 319
Lime for Asphalt Mixtures	AASHTO T 303
Density of In-Place Hot Mix Asphalt (HMA) Pavement by Electronic Surface Contact Devices	FOP for AASHTO T 343 Method C
Determination of Reclaimed Asphalt Pavement (Rap) Aggregate Bulk (Dry) Specific Gravity (G_{sb})	Idaho IT-146

405.03 Construction Requirements.

A. Mix Design. Develop a mix design that includes the job mix formula (JMF), reviewed, approved, stamped and signed by the Professional Engineer in responsible charge of the mix design and licensed in the state of Idaho. Use a qualified laboratory. The Department requires the mix design to be developed by an individual that is qualified by the Department as a Superpave Mix Design Technician. Provide all worksheets, notes, calculations, and outputs generated by testing equipment. Include signature and WAQTC/PE license number for all testers and reviewers and checked by on each sheet.

Proportion the aggregate fractions to meet the grading and physical properties of the Engineer approved JMF.

The grade of asphalt is specified on the plans. The Contractor may choose to use a PG binder that is equal to or one grade higher on the high temperature side and that is equal to or one grade lower on the low temperature side than is specified and that produces a mixture that meets all contract requirements at no additional cost to the Department.

Select the grade, brand, and source of asphalt and additives to be used in the project, for the JMF. The Contractor may need to adjust the virgin asphalt PG binder grade used in the mix in order to achieve the PG binder grade called for on the plans when RAP is used.

The JMF represents the aggregate grading and optimum asphalt binder content that produces the desired mix criteria in the laboratory. Specify a single aggregate gradation, the optimal asphalt content, the theoretical maximum specific gravity, G_{mm} , and the bulk specific gravity, G_{mb} , of a specimen compacted to N_{design} . Select the optimum asphalt binder content as the asphalt binder content that results in 4.0 percent air voids at N_{design} . Provide a recommended temperature range from the asphalt binder supplier at which the mixture will be mixed and compacted for Superpave testing in accordance with the requirements of AASHTO R 35. Compact G_{mb} specimens at the recommended mixing and compaction temperatures of the PG binder shown on the plans, regardless of RAP percentage used.

Establish a single percentage of aggregate passing the following sieve sizes:

2", 1½", 1", ¾", ½", ⅜", No. 4, No. 8, No.16, No. 30, No. 50, No. 100, and No. 200 from the JMF. Report the sieve results to the nearest whole number except for the No. 200. Report the No. 200 to the nearest tenth. Ensure the single percentage passing as shown on the proposed JMF grading is within the minimum and maximum control points specified in 703.05.

Design Superpave mixes in accordance with the requirements of AASHTO R 35. Have the equipment specified in AASHTO T 312 and a Department qualified Superpave Mix Design Technician available. Provide the Brand, Model Number, and Serial Number of the Superpave Gyrotory Compactor (SGC) to the Engineer. Use a SGC that meets the requirements of AASHTO T 312 and AASHTO T 344 (internal angle $1.16^{\circ} \pm 0.02^{\circ}$). Provide Superpave mixes that comply with the gradation requirements of 703.05.

Condition the Superpave mixes in accordance with AASHTO R 30 except modify Section 7.1.2 so the mix designer selects a temperature to condition the mixture within the compaction temperature range as recommended by the asphalt binder supplier.

Compact the design mixture in accordance with AASHTO T 312 except modify Section 8.1.2.1 so the mix designer selects a mixing temperature within the mixing temperature range as recommended by the asphalt binder supplier and modify Section 8.1.7.1 so the compaction temperature is determined by the mix designer and is used for AASHTO T 312 testing. The number of gyrations used is defined in Table 405.02-1 for the type of mix specified.

The Department will determine the bulk dry specific gravity of aggregate, G_{sb} , apparent specific gravity of aggregate, G_{sa} , and water absorption (by % weight of dry aggregate) of the coarse and fine aggregate used in the mixture using AASHTO T-85 and Idaho IT-144. The Engineer will evaluate the RAP G_{sb} , if used, using the RAP G_{sc} . The Contractor and Department shall use the following procedure to determine these values as follows:

Provide aggregate and RAP to the Engineer for G_{sb} testing in accordance with 405.03.A Materials and Sample Submittals. Provide the Asphalt Binder/Aggregate Correlation factor for asphalt binder and gradation for each RAP stockpile. A Contractor's representative may be present during the G_{sb} testing to ensure a value that both the Department and the Contractor can agree upon, if requested. Use the established G_{sb} in the mix design calculation and report and for production paving testing. The Engineer will use the established G_{sb} during the mix confirmation process, acceptance test strip testing and verification testing. Allow the Engineer three business days for testing.

Design and compact the mixture at the N_{design} gyrations specified in Table 405.02-1. Use a 4.0 percent design air void content at the design number of gyrations (N_{design}) for mixtures as shown in Table 405.02-1. Verify N_{max} as part of the design process by compaction of at least two specimens at the design asphalt content to N_{max} to ensure the number of gyrations required in Table 405.02-1 does not produce a mixture that exceeds the relative density of N_{max} given in Table 405.02-1.

Ensure the Voids in the Mineral Aggregate (VMA) of the mixture during design, is at least 0.3 percent greater than the minimum value specified in 703.05 when the mixture is compacted to N_{design} . The Engineer will not accept mix designs that do not meet this criterion.

Ensure the VMA of the mixture meets the specification as shown in 703.05 during production. Calculate VMA in accordance with the procedures specified in Section 260 of the Department's Quality Assurance Manual.

Ensure the Voids Filled with Asphalt (VFA) criteria of the mixture is as shown in Table 405.02-1 at the design number of gyrations during design and production. Calculate VFA in accordance with the procedures specified in Section 260 of the Department's Quality Assurance Manual.

Meet the Dust to Binder Ratio requirements in Table 405.02-1. The Dust-to-Binder Ratio or Dust Proportion (DP) is, by mass, the ratio between the percent of aggregates passing the No. 200 sieve and the effective binder content. Calculate the effective binder content in accordance with the procedures outlined in Section 260 of the department's Quality Assurance Manual.

Test the Superpave HMA mixture for moisture-induced damage in accordance with AASHTO T 283. Ensure the mixture has a Tensile Strength Ratio (TSR) of 80 percent or more, using a minimum of one-half percent anti-strip additive or a determined mass of hydrated lime. If the TSR test fails (less than 80 percent), the material may be retested by ASTM D1075.

Perform Asphalt Pavement Analyzer (APA) testing on SP3 and SP5 mixtures. Test in accordance with AASHTO T 340. Do not exceed a 0.2 inch maximum rut depth in the tested mixture.

Perform three aggregate gradation trial blends at a single asphalt content that achieves a laboratory air void content of 3.0 percent to 5.0 percent in accordance with AASHTO R35. Include additional minus No. 200 material in each blend to account for aggregate breakdown during production and describe in the mix design the method(s) used to maintain the minus No. 200 target value throughout the project.

Determine the aggregate gradation in the asphalt mixture by an ignition burn of the asphalt mixture from a laboratory prepared sample. Batch the laboratory sample on the basis of component percentages as shown on the proposed JMF gradation. Obtain the aggregate in accordance with the requirements of FOP for AASHTO T 308. Report the sieves specified in this subsection, beginning with the maximum size for the mix.

Conduct testing during the mix design to identify hot mix aggregate subject to breakdown in the ignition furnace. Report the aggregate gradation correction factors, determined in accordance with FOP for AASHTO T 308, for specification sieves in the mix design. Apply aggregate gradation correction factors to the specification sieves when determining compliance with specifications only when breakdown was determined and reported in the mix design.

Provide four correction factor samples produced by the laboratory producing the mix design, at the design asphalt binder content, for each ignition furnace to be used on the project for mix design confirmation, acceptance, verification and dispute resolution testing. Prepare 16 correction factor samples at the same time in accordance with FOP for AASHTO T 308. Submit 12 correction factor samples to the Engineer when submitting mix design confirmation materials and samples.

Per FOP for AASHTO T 308, each ignition furnace to be used on the project requires a unique asphalt binder correction factor determined using aggregate produced for the project. Determine the asphalt binder correction factor for each furnace where project testing will be performed.

Use AASHTO R 35 Appendix to design WMA mixes and provide the following documentation:

1. WMA technology information, WMA additives information, or both
2. WMA technology manufacturer's recommendations for use.
3. WMA technology manufacturer's target rate for water and additives, the acceptable variation for production, and documentation showing the impact of excessive production variation.
4. WMA technology material safety data sheets (MSDS)
5. WMA technology laboratory and field temperature range for mixing
6. WMA technology temperature range for compacting
7. Asphalt binder performance grade test data over the range of WMA additive percentages proposed for use.
8. Laboratory test data, samples and sources of all mixture components and asphalt binder-viscosity-temperature relationships.

Use anti-stripping additives, silicone additives, WMA additives, and WMA technologies as specified. Comply with approved mix design quantities. Confirm the addition rate through quality control field tests during production.

Maintain manufacturer's recommendations on file at the asphalt mixing plant and make available for reference when producing Superpave WMA.

Mix Design Documentation and Test Results. For each job mix formula submitted to the Engineer, include the following:

1. Submit all sheets legible in: electronic, printed, and copied forms and numbered consecutively.
2. All sheets oriented properly in the electronic submittal
3. The name(s) of who is responsible for quality control of the mixture during production of the mix design. The name(s) of who is responsible for developing the mix design and the name(s) of who performed the tests. The name(s) of who checked the work. Provide the WAQTC or PE license number and signatures of these individuals on all worksheets and summary sheets.
4. Gradation data for each aggregate component of three trial blends. Include additional minus No. 200 material to account for aggregate breakdown during production. Label this item 'Breakdown' on the mix design sheet. Describe in detail in the mix design the method(s) used to maintain the minus No. 200 target value throughout the project. Show percent passing for the following sieves: 2", 1½", 1", ¾", ½", ⅜", No. 4, No. 8, No.16, No. 30, No. 50, No. 100,

- and No. 200. Report grading to the nearest one percent except for the No. 200 sieve. Report the No. 200 sieve to the nearest tenth of a percent.
5. The source, source number, and materials description (i.e. quarried or gravel), used. The proportion of each aggregate (in percent of total aggregate) from each source, and include the specified RAP records. If multiple aggregate sources are used, identify the stockpiles with the appropriate aggregate source number on blending and batching sheets.
 6. The design ESAL's when specified.
 7. The composite washed gradation based on (2) and (3) above.
 8. The bulk (dry), G_{sb} , and apparent, G_{sa} , specific gravities and water absorption (by percent weight of dry aggregate) of both coarse and fine aggregate for each aggregate component or for the total aggregates used in the mixture. Attach the Department documentation for G_{sb} determination.

NOTE: The Department will determine these values by using AASHTO T 85 and Idaho IT 144 and provide them to the Contractor. RAP G_{sb} , when used, will be calculated using the RAP G_{se} .

9. The composite gradation plotted on a 0.45 power chart.
10. The PG binder grade and percentage (in units of 0.1 percent) of asphalt binder material to be added based upon the total mass of the mixture. When RAP is used, report the adjusted virgin asphalt PG binder grade and the percentage (in units of 0.1 percent) of virgin asphalt binder material to be added based upon the total mass of the mixture in order to achieve the PG binder grade specified.
11. The design traffic level and the initial, design, and maximum number of gyrations $N_{initial}$, N_{design} , and N_{max} .
12. Report the value of the theoretical maximum specific gravity, G_{mm} and bulk specific gravity, G_{mb} of the asphalt mixture to 3 decimal places. Report Optimum Asphalt Content, Air Voids, and VMA to the nearest tenth and report VFA to the nearest whole number.
13. Plot at least four different asphalt binder contents (minimum 0.5 percent between each point), so there is at least one point above and one point below the estimated asphalt binder percentage. Pick the optimum asphalt binder content at 4.0 percent air voids from the plotted curve. Run one trial at the optimum AC binder content to verify the specimen values match the values from the curve and provide blending and batching worksheets for this trial.
14. The theoretical maximum specific gravity, G_{mm} , at each asphalt binder content. The average of at least two specimens at each asphalt binder content. Use the G_{mm} for percent air voids determination and use the procedures outlined in Section 260 of the Department's Quality Assurance Manual.
15. The test results for the individual and average bulk specific gravity, density, and heights, of at least two specimens at each asphalt binder content.
16. The percent air voids in the mixture at each asphalt binder content.
17. The percent VMA at each asphalt binder content.
18. Dust to binder ratio calculated to the nearest 0.1 percent at each asphalt binder content.
19. The Tensile Strength Ratio results at the optimum asphalt binder content.
20. Ignition Furnace calibration data according to FOP for AASHTO T 308, including specimen burn temperature.
21. Ignition Furnace printed ticket. Attach the "long" printed ticket that continuously records the temperature and mass each minute during the burn.
22. Graphs showing air voids, VMA, VFA, G_{mb} and G_{mm} , vs. percent asphalt binder content for each of the asphalt binder contents submitted with trial mix. No more than two graphs per sheet.
23. The test results from the composite aggregate blend at the proposed JMF proportions indicating compliance with the Percentage of Fracture in Coarse Aggregate, Fine Aggregate Angularity, Sand Equivalent, and Flat and Elongated as shown in Table 703.05-1. When RAP is used, report the Percentage of Fracture in Coarse Aggregate and Flat and Elongated of the composite blend including RAP. Test Fine Aggregate Angularity and Sand Equivalent on the composite aggregate blend at the proposed JMF proportion without the RAP proportion.

24. Provide the Laboratory mixing and compaction temperatures and field mixing and compaction temperature ranges by the asphalt binder supplier. Use the laboratory compaction temperature to compact all gyratory specimens for acceptance and verification testing.
25. Provide the sample mass determined in the mix design process that results in a gyratory specimen height of 115 mm.
26. Label gyratory compaction tables and curves, generated by the gyratory compactor, from the trial blend.
27. Provide the gyratory compactor printout that includes specimen height, force, internal angle and shear, if available, for each gyration for each specimen compacted to N_{des} at optimum binder content.

Material and Sample Submittals. Submit the following materials and samples to the Engineer, when applicable:

1. A 50 pound uncompacted asphalt mix sample that complies with the JMF.
2. Six Gyratory briquettes compacted to N_{des} and in compliance with the JMF. Determine V_a of each specimen and clearly label the air void content for AASHTO T 340 testing (for SP3 and SP5 only). The APA specimens must have an air void content of 7.0 ± 0.5 percent air voids.
3. Six individually packaged aggregate specimens fabricated in accordance with AASHTO T 283 to produce 6-inch specimens at $7.0 \pm 0.5\%$ air voids except do not add the binder. Provide enough binder without anti-strip added and anti-strip additive to make six test specimens. Include enough aggregate, binder, and anti-strip additive for a “buttering batch”. The Department will prepare test specimens from the material and perform testing in accordance with AASHTO T 283. Report the mass required to achieve 7.0 ± 0.5 percent air voids.
4. A 25 pound minimum representative sample of each stockpile of aggregate for G_{sb} testing and at least a 25 pound sample of the combined coarse and fine aggregate at mixture proportions. Include blend sheets for the mixture proportions.
5. A 25 pound minimum representative sample of the RAP to be used along with the RAP stockpile records and test data. Provide the gradation and binder contents of the RAP sample in accordance with 720.07. Provide the RAP Asphalt Binder/Aggregate Correlation Factor in accordance with 720.07.
6. One-thousand gram sample of other mineral admixtures, such as lime or fly ash, when used.

The Department will use these samples for laboratory examination, “Materials properties” evaluation, and to perform AASHTO T 340, “Determining Rutting Susceptibility of Asphalt Pavement Mixture Using the Asphalt Pavement Analyzer (APA)” on the specimens for mix design confirmation.

The Department will not begin testing until all of the required mix design paperwork has been received.

The Engineer will provide the Contractor with a confirmation or rejection of the mix design no later than five working days after receiving the job-mix formula and materials. Rejection of the mix design will require an additional five working days for re-evaluation. Additional materials and a new mix design may be required from the Contractor. Obtain Department confirmation of the Contractor’s mix design before beginning acceptance test strip placement.

Previously Used Mix Designs. The Contractor may use a mix design that includes the JMF that was previously confirmed by the Department and accepted for use on other projects and meets the requirements of this subsection. No changes to the mix design are allowed except as noted below:

Adjustments made in accordance with 405.03-H, Table 405.03-5 to the asphalt content and gradation of a previously approved mix design that became the Contractor-Job Mix Formula, (C-JMF), for the project are acceptable changes.

Prepare a submittal that includes:

1. The original approved mix design that includes the confirmed JMF from the previous project. Do not make modifications to this document.
2. Documentation supporting adjustments to the Previously Used Mix Design:
 - a. adjustments made to the JMF that make it the C-JMF;
 - b. adjustments made to the C-JMF during production;
 - c. Acceptance test reports, plant reports, records and diaries supporting these adjustments.
 - d. If no adjustments were made, provide acceptance test reports, plant reports, records and diaries for the C-JMF used.
3. Current Stockpile Quality Control testing that includes the following to confirm the material in stockpile is similar to the material used for the original mix design, including RAP:
 - a. Sieve analysis on the stockpiles to be used, including crusher control charts;
 - b. Coarse and fine aggregate specific gravities and absorptions, (Performed by ITD).

Note: Previously used mix designs that are used during the calendar year of confirmation may omit Step 3 if the stockpiles consist of the crushed material, including RAP, from the original mix design. If more than one calendar year has elapsed from the time of confirmation include Step 3. Changes in gradation, specific gravity and absorption due to additional crushing may prevent acceptance of a previously used mix design.

4. Ignition furnace correction factors in accordance with this subsection using the asphalt content and gradation of the proposed JMF:
 - a. Asphalt binder content correction factor per FOP for AASHTO T 308;
 - b. Aggregate gradation correction factors per FOP for AASHTO T 308.
5. Use the C-JMF from above to run one trial at the optimum AC binder content to verify it produces specimen values that match the values from original design curves.

Note: Previously used mix designs that are used during the calendar year of confirmation may omit Step 5
6. A Cover letter requesting the use of a previously used mix design and stating the project name, key number, etc. of the project that the previously used mix design will be used, and the project name, key number, etc. of the previously used mix design. Include a summary sheet of all the volumetric mix design test results and any other pertinent information from prepared specimens using the aggregates, the PG binder, and additives verified in the previous steps,

The Engineer will forward all previously used mix designs submitted by the Contractor to the Central Laboratory for review and recommendation. The asphalt content, type and grade, aggregate materials, gradation, and anti-strip additive rate, type and grade, must be the same as previously approved to be considered acceptable as a previously used mix design.

The Department will not begin mix design evaluation until all supporting documentation is received.

Non-Structural and Temporary Superpave HMA. Non-structural Superpave HMA refers to paving applications that are out of trafficked areas, such as behind guardrails, gore areas, raised medians, asphalt curbs and other non-critical, non-traffic load applications. Temporary Superpave HMA refers to pavement that will be removed before the end of the project such as detours or pavement used in construction staging. Temporary Superpave HMA is not for permanent use. Remove temporary Superpave HMA before project completion. The Department considers Removal of Temporary Superpave HMA incidental and the costs included in the Superpave HMA contract pay item unless otherwise specified.

For pavement designated in the contract as Non-Structural (NS), or Temporary (T), the class of Superpave HMA mix will be identified in the bid schedule with the initials NS or T respectively. For example: SP-NS is Superpave HMA not in the travelled way and can be any class of Superpave HMA; SP-T is Superpave HMA used for temporary pavement that must be removed before completion of the project. Superpave HMA for temporary pavement may have a class of mix designated in the plans, depending on the intended use of the pavement.

The Department will not require materials and samples to be submitted for mix design confirmation testing for mixtures designated as NS or T. Submit mix designs to the Engineer for paper review only.

Mix Design Tolerance. The Engineer will apply the tolerances as shown in Table 405.03-1 to the Department’s test results when evaluating the job mix formula. If the Department’s test results are within the established tolerances and control points established in 703.05, the job mix formula will be confirmed by the Engineer. The Contractor has the option to proceed to the acceptance test strip or submit another job mix formula for examination and evaluation.

Table 405.03-1 - Quality Tolerance

<i>Quality Characteristic</i>	<i>Tolerance</i>
Gradation	
No.4 sieve and larger sieves, %	JMF value \pm 6.0 ^a
No. 8 to No. 30 sieves, %	JMF value \pm 5.0 ^a
No. 50 to No. 100 sieves, %	JMF value \pm 4.0 ^a
No. 200 sieve and smaller sieves, %	JMF value \pm 2.0 ^a
Laboratory Air Voids, %	4.0 \pm 1.5
VMA, %	703.05 minimum value – 1.0
Asphalt Binder Content, %	JMF value \pm 0.4
Dust Proportion (DP)	Table 405.02-1 range \pm 0.1
VFA	See Section 260.01.03 of QA manual
AASHTO T 283	See Section 260.01.03 of QA manual
G_{mm}, G_{mb}, G_{sb}	See Section 260.01.03 of QA manual

^a in no case shall the upper and lower specification limits be outside the control points specified in 703.05

B. Weather Limitations for Permanent Paving. Do not place Superpave HMA on a wet or frozen surface or when weather or surface conditions will otherwise prevent the proper handling or finishing of the Superpave HMA material. Place Superpave HMA in accordance with the temperature limitations shown in Table 405.03-2.

Table 405.03-2 - Air and Surface Temperature Limitations

Compacted Thickness of Individual	Top Course	Leveling and Courses Below the Top Course
Less than 0.10 ft	60 °F	50 °F
0.10 to 0.18 ft.	50 °F	40 °F
Over 0.18 ft.	40 °F	40 °F

Provide a paved surface for travel if the project should extend into the winter. Do not start construction on the pavement surface unless the progress schedule realistically shows that the pavement can be replaced or completed within the temperature limitations listed above.

C. Mixing Plants. Operate all equipment according to the manufacturer’s recommendations or provide an explanation of the variations from the recommendations. Use mixing plants capable of producing a uniform mixture and that comply with the following requirements:

1. *Plant Scales.* Provide plant and truck scales that comply with 109.01.
2. *Asphalt Storage.* Provide asphalt storage tanks to heat and hold the materials at the required temperatures. Store and introduce the asphalt into the mix at the supplier recommended temperatures. Submit the supplier's recommendations to the Engineer.

Accomplish heating so that the flame is not in contact with the tank. Design the storage system for the asphalt to assure proper and continuous circulation during the operating period. Install the tank level and provide to the Engineer a calibrated measuring rod, or other Engineer approved measuring device. Make provisions for measuring and sampling contents of the storage tanks.

3. *Feeder.* Equip plants with accurate mechanical means for uniformly feeding the aggregate into the dryer. When multiple stockpiles are required, ensure the RAP and virgin cold aggregate feed equipment is capable of providing accurate metering of individual stockpiles into the mix.

Determine the moisture content of the virgin aggregates and RAP daily during production, or as necessary, and record the moisture test results. Provide equipment that electronically injects the determined moisture content of the cold feed materials (RAP and virgin aggregates) into the belt weighing systems and automatically corrects wet material weights to dry material weights.

Provide positive weight control and monitoring of the aggregate feed and interlock the RAP cold feed rate and virgin aggregate cold feed rate by use of a conveyor scale or other Engineer approved device. Weigh the material to within 0.5 percent of the intended quantity. Provide a feed system capable of rapid adjustment to maintain a consistent and uniform flow throughout the range of its calibration. Accurately proportion the aggregate through control gates from each compartment. Provide positive mechanical means to adjust one dimension of the rectangular gate. Do not screen or proportion after cold feed blending.

When RAP is used, use a scalping screen or other Engineer approved device installed ahead of any weight system to ensure that no RAP agglomerates larger than 2 inches are fed into the mixing plant.

Introduce RAP into the mixing plant at a location far enough downstream from the burner to be away from the flame and extremely hot gases.

Provide to the Engineer the following mixing plant information:

- a. Dry virgin aggregate rate in tons per hour,
- b. dry RAP rate in tons per hour,
- c. binder in tons per hour,
- d. total virgin aggregates, RAP and binder in tons per hour.

Print the mixing plant information on a ticket at an Engineer approved time interval and submit tickets at the end of each day's production.

4. *Dryer/Mixer.* Continuously agitate the aggregates during the heating and drying process in a dryer that is capable of meeting the aggregate moisture requirements of 405.03.F Equip dryers with automatic burner controls.

Include a mixer that may be part of the dryer or a separate unit that is capable of adequate mixing. Operate the plant only within the range of calibration.

5. *Asphalt Control Unit.* Interconnect the asphalt control unit with the aggregate feed control so that it is capable of delivering asphalt to the mix within ± 0.2 percent of the intended quantity throughout the range of plant operation. Provide satisfactory means, by weighing or metering, for obtaining the quantity of asphalt delivered.
6. *Thermometric Equipment.* Provide adequate continuous thermometric recording equipment to indicate, at a minimum, the temperature of the asphalt in the storage tank, and temperature of the heated material after leaving the dryer or pug mill.
7. *Sampling Devices.* Equip crushing, screening and mixing plants with Engineer approved sampling equipment operable from the ground or a platform. Construct and operate the device so

that it will move at a constant rate across the full width of the falling column of material from the discharge belt or chute. Construct the sampling equipment so that a representative sample can be taken and conveyed to the ground by a means of a slide, chute, or other means where the sampled material can be safely and conveniently collected.

Provide a sampling device on the mixing plant's asphalt binder tank injection line and sample the asphalt binder in accordance with the department's Quality Assurance Manual.

8. *Storage Silo Batcher.* Equip the plant with a Storage Silo Batcher that opens and closes throughout production to ensure uniform charging of the storage silo. Time the opening and closing such that no material passes directly from the slat conveyor into the silo.
9. *Discharge Hopper.* Equip the plant with a discharge hopper having dump gates that will permit rapid and complete discharge of the mixture.
10. *Hot Storage.* Provide continuous mix plants with sufficient hot storage capacity to ensure continuous plant operation. Do not remove material below the top level of the cone of the hot storage silo except at the end of the day's production.
11. *Plant Calibration.* Calibrate plants for accuracy requirements.
12. *WMA Technology.* Provide WMA metering devices that meet the WMA technology manufacturer's current recommendations for liquid or mineral additives. Document the integration of plant controls and interlocks when using WMA additive devices. Comply with the manufacturer's recommendations for incorporating additives and WMA technologies into the mix. Comply with manufacturer's recommendations regarding receiving, storage and delivery of additives.

- D. Hauling Equipment.** Provide trucks used for hauling Superpave HMA materials that have tight, clean, smooth, metal bodies equipped with a positive locking metal gate. When necessary, cover each truck with a canvas or other suitable material to protect the mixture from the weather. The Contractor may apply a release agent, suitable for its intended use, to truck beds. After application, drain the truck bed. Do not use fuel oil or other petroleum oils as a release agent.

Provide an adequate platform to enable safe sampling when sampling from truck transports. Sample in accordance with WAQTC FOP for AASHTO T 168.

- E. Paver.** Provide a self-propelled paver equipped with an activated and heated vibratory screed that is equal to the width of the paving being performed. Activate screed extensions and heat vibratory screeds, except for minor shoulder widening not exceeding 1 foot and produce a pavement equal to that produced by the remainder of the screed. Equip the paver with a receiving hopper having sufficient capacity for a uniform spreading operation. Equip the hopper with a distribution system to place the mixture uniformly in front of the screed.

Provide extended screeds with corresponding auger and tunnel extensions to ensure a uniform head of fresh material across the entire screed. Install reverse screw augers with a minimum efficiency of 75 percent at the gear box for paving activities. Ensure equipment manuals for the paver and screed are continuously on the project for the operator's and Engineer's reference.

The Contractor may use alternate paver configurations provided they comply with the manufacturer's recommendations and can be demonstrated to produce an acceptable pavement. The alternate configuration must be accepted in writing by the Engineer before use on the project.

Equip the screed with automatic controls that will make adjustments in both transverse and longitudinal directions. Provide a sensing device that is adaptable to picking up grade information from a string line, rail, ski, laser or other Engineer approved method. Operate the paver at a speed consistent with the delivery of Superpave HMA to provide a smooth uniform travel with the paver stopping only under unusual circumstances. Provide a paver (including when screed extensions are used) capable of producing a smooth uniform texture, dense joints and a smooth riding surface. Provide enough trucks to maintain a continuous paving operation.

- F. Mixing.** Do not exceed the control point upper and lower specification limits specified in Table 703.05-2 when applying the applicable tolerances to the acceptance test strip JMF or Contractor-Job Mix Formula (C-JMF) for Superpave HMA.

Do not exceed 0.3 percent moisture content in the mixture at the time of placement when tested by AASHTO T 329.

Mix material with the range specified in Table 405.03-4.

- G. Superpave HMA Paving Plan.** Immediately before paving, the Contractor, the asphalt supplier, the Engineer, and the Department personnel involved in the paving operation will hold a pre-operational paving meeting to discuss the means that will achieve the highest quality surface.

Before the pre-operational paving meeting, submit a Superpave HMA paving plan to the Engineer. Tailor the plan to the asphalt to be supplied, the anticipated JMF, and the Contractor's equipment and operation. Include at least the following:

- Breakdown, intermediate, and finish rollers to be used
- Static or vibratory rolling for breakdown and intermediate rolling
- Frequency, amplitude, force/impact, and roller velocity for vibratory rolling
- Proximity of breakdown roller to paver with respect to horizontal displacement
- Proximity of intermediate roller to breakdown roller
- Compaction temperatures for breakdown, intermediate, and finish rolling
- Adjustments to paving/compaction operation with respect to temperature, amplitude, frequency, lift thickness, gradation, force/impact, and roller velocity
- Rubber tired rolling with respect to pickup of pavement material
- Paving equipment and preheating and vibratory settings of the screed
- Coordination of plant production and paving operations; climate, haul distance
- Surface and air temperatures anticipated during production
- Temperature necessary to allow public traffic onto the new pavement surface
- Anticipated traffic control issues as necessary
- Additional equipment required
- Inspection, sampling and testing requirements
- Other paving issues as necessary

- H. Acceptance Test Strip.** Construct an acceptance test strip, in accordance with Idaho IR125. Construct one test section of the acceptance test strip using the JMF. The Department does not require acceptance test strips on projects less than one lane mile in length or for leveling courses, non-structural pavement, or temporary pavement. Lane miles are the length (in miles) multiplied by the number of travel lanes.

Construct the acceptance test strip to the same placement width and thickness as the course it represents. Perform additional acceptance test strip(s), at no additional cost to the Department, if aggregate or asphalt binder sources change or the JMF changes.

The Contractor may elect to construct additional test sections. Submit the selected changes for each additional test section to the Engineer in writing. Only a qualified Superpave mix design technician or professional engineer may make changes.

The Department will not make separate payment for construction, sampling or testing of the initial acceptance test strip or any additional test strips.

The acceptance test strip is one lot.

Produce and compact WMA for the acceptance test strip at the lowest mixing and compaction temperatures that will be used during production. Do not mix or compact WMA at temperatures during production that are less than the acceptance test strip WMA temperatures unless Engineer approved.

When foaming processes are used, the Engineer may test the produced material for the following:

- Stripping (AASHTO T 383)
- Rutting Susceptibility (APA)

Obtain three mix samples from each test section in accordance with Idaho IR-125, in the presence of the Engineer. Place portions totaling at least 100 pound of mix for each mix sample in multiple 9 in x 9 in x 9 in cardboard storage containers that comply with Subsection 220.1 of the Department's Quality Assurance Manual. Properly identify the containers and immediately submit to the Engineer. The Department will combine the portions making up the samples and split each 100 pound mix sample at the Department's testing laboratory in accordance with AASHTO R47, with half tested for acceptance and half retained for dispute resolution. See Table 405.03-3 for sampling and testing requirements.

Obtain three cold feed aggregate sample increments and immediately submit them to the Engineer for testing. See Table 405.03-3 for sampling and testing requirements. Make available at the mixing plant aggregate gradation test results and running averages of stockpiles developed before the acceptance test strip.

Obtain three RAP sample increments from the RAP feed belt, totaling at least a 50 pound sample, and immediately submit them to the Engineer for testing when RAP is used. See Table 405.03-3 for sampling and testing requirements.

Obtain five randomly located core samples from the compacted Superpave HMA placed in each test section, in accordance with Idaho IR125. The Engineer will observe the core sampling. Immediately submit the cores to the Engineer for testing to determine the density of the compacted acceptance test strip and to determine the density correction factors for density equipment. The Department will determine core densities in accordance with AASHTO T 166, Method A or AASHTO T 331. The Department may use ASTM D7227 to dry the cores. The Department will determine density correction factors for density equipment in accordance with AASHTO T 355 or FOP for AASHTO T 343.

The Department will require seventy-two hours from the time of receipt of Superpave HMA mix samples and core samples to perform acceptance testing. Time will begin when the Engineer is in possession of the required samples and associated paperwork needed to perform the specified testing.

The Department will require an additional 48 hours to perform acceptance test strip confirmation testing if stripping and rutting susceptibility tests are not performed on laboratory produced WMA during mix design confirmation.

The Engineer will allow off-site acceptance test strips when performed in accordance with Idaho IR125.

When off-site JMF Verification is performed, obtain three mix samples from each test section in accordance with Idaho IR-125, in the presence of the Engineer. Place portions totaling at least 100 pound of mix for each mix sample in multiple 9 in x 9 in x 9 in cardboard storage containers that comply with Subsection 220.1 of the Department's Quality Assurance Manual. Properly identify the containers and immediately submit to the Engineer. The Department will combine the portions making up the samples and split each 100 pound mix sample at the Department's testing laboratory in accordance with AASHTO R47, with half tested for acceptance and half retained for dispute resolution. See Table 405.03-3 for sampling and testing requirements.

Obtain three cold feed aggregate sample increments and immediately submit them to the Engineer for testing. See Table 405.03-3 for sampling and testing requirements. Make available at the mixing plant aggregate gradation test results and running averages of stockpiles developed before the acceptance test strip.

Obtain three RAP sample increments from the RAP feed belt, totaling at least a 50 pound sample, and immediately submit them to the Engineer for testing when RAP is used. See Table 405.03-3 for

sampling and testing requirements. The Engineer will determine the random location for sampling. The Department will require seventy-two hours from the time of receipt of Superpave HMA mix samples and cold feed samples to perform volumetric and aggregate acceptance testing.

After approval of volumetrics, construct Density Gauge Correlation Section on the prepared roadway of the project consisting of the first 1000 feet of the first days paving. Obtain 5 randomly located core samples as specified in Idaho IR-125. The Engineer will determine the G_{mm} used in the density determination from the State's two Verification Tests on the first day's paving plus one additional random sample. . The Department will require forty-eight hours from the time of receipt of cores to perform density acceptance testing. Time will begin when the Engineer is in possession of all of the required samples and associated paperwork needed to perform the specified testing.

Repair deficiencies created by the coring operation at no additional cost to the Department. Obtain the Engineer's approval of repair methods and materials before beginning coring.

The Engineer will base test strip acceptance on the requirements of Table 405.03-3. Do not begin production paving until properties of the acceptance test strip are accepted.

**Table 405.03-3
Superpave Acceptance Test Strip Testing Requirements**

Material	Quality Characteristic	Test Method	Number of Tests	Point of Sampling & Method	Sampled By	Tested By
Compacted Pavement	Density (Cores) ^b	AASHTO T166 Method A or T331	Per Section H Acceptance Test Strip	Roadway	Contractor	State
Mix	Asphalt Content ^e	AASHTO T308	One per Test Section (average of 3 samples)	AASHTO T168 (See QA Manual Section 270) (three random samples; locations determined)	Contractor	State
	Gradation ^c	AASHTO T30			Contractor	State
	Air Voids, VMA, VFA, Dust to Binder Ratio ^a	AASHTO T312; AASHTO T166 Method A or T331; AASHTO			Contractor	State
	Rice Gravity	AASHTO T 209 or ASTM D6857			Contractor	State
	Asphalt Pavement Analyzer ^f	AASHTO T 340			Contractor	State
	Moisture Content	AASHTO T 329			Contractor	State
Aggregate d	Fracture	AASHTO T 335 Method 1	One per Test Strip (combination of 3 increments)	Cold Feed AASHTO T2 (three random increments)	Contractor	State
	FAA	AASHTO T 304 (Method A)			Contractor	State
	F&E	FOP for ASTM D4791			Contractor	State
	Sand Equivalent	AASHTO T 176 (Alt. Method 2, Mechanical)			Contractor	State

^a The average test results from the Superpave HMA samples for each test section must meet the requirements of Table 405.03-4, (the AASHTO T 283 test will not be required by the Department).

^b The average density of the cores for each test strip must be no greater than 96.0 percent and no less than 92.0 percent of the Maximum Theoretical Density as determined by AASHTO T 209 or ASTM D6857. The G_{mm} value to be used for each test strip is the average G_{mm} calculated from each test section of the acceptance test strip.

^c The average AASHTO T 30 gradation of three randomly selected mix samples must meet the gradation requirements of Table 405.03-4, for each individual test section.

^d The test results from combining three cold feed aggregate samples must meet the requirements of Table 7.3.05-1 for “Coarse Aggregate fracture face,” “flat and elongated,” “uncompacted void content of fine aggregate,” and “sand equivalent.” No tolerance is allowed.

^e The average asphalt binder content for each test section must meet the requirements of Table 405.03-4.

^f Samples tested in accordance with AASHTO T 340 (asphalt pavement analyzer) must meet the requirements of 405.03.A.

Acceptance Test Strip Tolerance. The Engineer will apply the following tolerances to the Acceptance Test Strip test properties specified in Table 405.03-4.

Table 405.03-4 - Acceptance Test Strip Tolerance

Quality Characteristic	Tolerance
SP 2 mixtures	
VMA, %	None allowed
Laboratory Air Voids, %	4.0 ± 1.0
Asphalt Binder Content, %	JMF value ± 0.4
Dust Proportion (DP)	Table 405.02-1 range ± 0.1
VFA, %	Table 405.02-1 range ± 5
No.4 sieve and larger sieves, %	JMF value ± 6.0 *
No. 8 to No. 30 sieves, %	JMF value ± 5.0 *
No. 50 to No. 100 sieves, %	JMF value ± 4.0 *
No. 200 sieve and smaller sieves, %	JMF value ± 2.0 *
Density	None allowed
SP 3 – SP5 mixtures	
VMA, %	703.05 minimum value – 0.3
Laboratory Air Voids, %	4.0 ± 1.5
Asphalt Binder Content, %	Selected asphalt content ± 0.3
Dust Proportion (DP)	Table 405.02-1 range ± 0.1
VFA, %	Table 405.02-1 range ± 5
No.4 sieve and larger sieves, %	JMF value ± 6.0*
No. 8 to No. 30 sieves, %	JMF value ± 5.0*
No. 50 to No. 100 sieves, %	JMF value ± 4.0*
No. 200 sieve and smaller sieves, %	JMF value ± 2.0*
Density	92.0 – 0.3 to 96.0+0.3

* in no case shall the upper and lower specification limits be outside the control points specified in 703.05

If the Department’s average test results for each characteristic fall within the tolerances provided, the acceptance test strip will be considered acceptable by the Engineer and the Contractor may proceed to production paving. Meet specification requirements when production paving begins.

The Contractor may place a new acceptance test strip or provide a new mix design to achieve specification requirements instead of proceeding, when test results fall outside the specification limits and within the tolerance limits.

If the Department’s test results fall outside the tolerances provided, the Engineer will consider the acceptance test strip unacceptable and the Engineer will not allow the Contractor to proceed to production paving. The Engineer will reject an unacceptable test section for SP 3 and 5 mixtures and require removal. The Department will not pay for the removal or the applicable contract pay item quantities. An unacceptable test section for SP 2 mixtures will be subject to rejection by the Engineer. If the Engineer determines the failed SP 2 test section may remain in place, the Contractor may leave the test section in place with a 50 percent reduction in price or remove the failed material and replace it with acceptable material and receive full payment. Remove the failed SP 2 test section if rejected by the Engineer. The Department will not pay for removal or for the applicable contract pay item quantities.

Upon Contractor request, the Engineer will evaluate the acceptance test results when the Department's average test results fall outside the tolerances provided for the listed sieves, asphalt content, or both. The Engineer will not conduct an evaluation unless the other acceptance characteristic values are within the specified tolerances. After evaluation, the Engineer will determine whether the acceptance test strip may be accepted.

If the Contractor is unable to meet the contract requirements, the Engineer may require a new mix design that meets contract specifications. Place a new acceptance test strip at no additional cost to the Department.

If the Contractor's testing determines the test strip fails, and the Contractor chooses to proceed with another test strip before receiving the Engineer's results, the Engineer will complete testing of the test strip in question and report the results before accepting material from the next test strip for evaluation.

Obtain the Engineer's test section acceptance before starting production paving.

After acceptance, the Department will pay for Superpave HMA Pavement and Asphalt Binder in the test strip under their respective contract pay items.

The Engineer will allow slight adjustments to the JMF to obtain the desired air voids, density, uniformity and constructability for SP-3 and 5 mixes. The Contractor may make slight adjustments to the asphalt content and gradation of the JMF of an approved acceptance test strip. If no adjustments are required, or when the Contractor's adjustments to the JMF are used, the approved JMF will become the C-JMF. For SP-2 mixes the Contractor may select the asphalt content and gradation of a passing test section within the test strip as the C-JMF.

Submit the C-JMF intended for use during production paving in writing to the Engineer. Use the C-JMF to establish target values when producing control charts during production paving. Use the C-JMF to establish asphalt content and gradation target values for SP-2 mixes.

- I. Tack Coat.** Apply an asphalt tack coat to the following surfaces in accordance with 401:
1. Existing plant mix surfaces and to the surface of each course constructed, except the final course.
 2. Paint or spray a thin, uniform tack coat of asphalt before placing pavement against the surfaces of curbing, gutters, manholes, Portland cement pavement, and other structures.
 3. Contact surfaces of transverse joints and cold longitudinal joints just before additional mixture is placed against previously laid material.
- J. Production Paving.** The Contractor may request to begin production paving in accordance with the C-JMF after the Engineer approves the acceptance test strip. Superpave HMA paving acceptance is based on the requirements in Table 106.03-1, "Material Subject to Statistical Based Acceptance" of the Quality Assurance Special Provision.
1. Documentation (Records). Maintain documentation, including test summary sheets and control charts, on an ongoing basis. Maintain a file of gyratory specimen heights for gyratory compacted samples and test worksheets. The Department encourages the Contractor to electronically record the gyratory compactor data. File reports, records, and diaries developed during the progress of construction activities Department.
 - a. Number test results in accordance with Department procedures and record on forms approved or supplied by the Engineer.
 - b. Deliver production test results on test summary sheets to the Engineer, by 11 AM of the day following production unless otherwise directed.
 - c. Include the following production test results and mixture information on a Department approved test summary sheet daily.
 - (1) Percent passing on sieves listed in 703.05.
 - (2) Theoretical maximum specific gravity, Gmm.

- (3) Bulk specific gravity, Gmb at Ndes.
 - (4) Percent asphalt binder content (Pb).
 - (5) Calculated production air voids (Va).
 - (6) Calculated Voids in Mineral Aggregate (VMA) and Voids Filled With Asphalt (VFA).
 - (7) Aggregate proportions in use at the time of sampling.
 - (8) Tons of mix that were inspected, sampled, and tested.
 - (9) Cumulative tons of mix.
 - (10) Dust to Binder Ratio.
 - (11) Signature Location for ITD and Contractor representative.
 - (12) Mixture moisture content.
 - (13) Department test result. (Provide when available).
- d. Submit copies of failing test results to the Engineer daily.
 - e. Provide the Engineer with asphalt loading certificates daily.
 - f. Provide a daily plant diary to include a description of quality control actions taken (e.g. adjustment of cold feed percentages) and include changes or adjustments on the test summary sheets and name of the qualified person that made changes.
 - g. Provide a final hardcopy summary of all quality control test summary sheets and control charts at completion of paving operations on the project to the Engineer. Submit a compact disk (CD) of the quality control test summary sheets, control charts and density worksheets to the Engineer.
2. Documentation (Control Charts). Record the following data on standardized control charts and make them available to the Engineer daily. The Contractor should generate control charts and summary sheets with a computer using Engineer approved methods.
 - a. AASHTO T-30 gradation, include all sieves shown in 703.05 for specified mixture.
 - b. Pb
 - c. Gmm and Gmb
 - d. Va , VMA, VFA, and Dust to Binder ratio.
 - e. Plot individual test results for each test point. Connect individual points with a solid line. Show specification limits and tolerances, where applicable, on the control chart.

Plot control charts as follows:

Aggregate Gradation. Test aggregate gradation, by AASHTO T 30, at the frequency shown in Table 106.03-1 for 405 Superpave HMA of the Quality Assurance Special Provision (QA SP), and plot the results on control charts for each sieve shown in 703.05. Plot the target gradation for each sieve from the C-JMF and plot the upper and lower specification limit for each sieve on the control charts. The control charts should be used by the Contractor as an aid to control the paving operation.

Asphalt Binder Content, Pb. Test asphalt binder content, by AASHTO T 308, at the frequency shown in Table 106.03-1 for 405 Superpave HMA of the QA SP, and plot the results on a control chart. Plot the target asphalt binder content from the C-JMF and plot the upper and lower specification limit on the control chart. The control chart should be used by the Contractor as an aid to control the paving operation.

Theoretical Maximum Specific Gravity. Test Gmm., by AASHTO T 209 or ASTM D6857, at the frequency shown in Table 106.03-1 of the QA SP and plot the results on a control chart. Use at least

two determinations that meet the “single operator” precision of 0.011 in AASHTO T-209, (Test results obtained without use of Section 11a) for each test. The average of two determinations constitutes one test result. Condition loose asphalt mixture samples for a minimum of two hours before testing to allow for binder absorption, unless otherwise allowed. Time begins when the binder is introduced to the aggregate. Condition all material used for acceptance tests. Match test condition time for material used for acceptance tests to the field conditions of the field compacted mixture. The Contractor must demonstrate to the Engineer that absorption is complete in less than two hours in the field in order to shorten condition time. Do not over-condition the material by keeping the samples at an elevated temperature.

Bulk specific gravity of compacted mixture. Test G_{mb} by AASHTO T 166, at the frequency shown and determine G_{mb} using the average of two compacted gyratory specimens sampled and tested in accordance with Table 106.03-1 of the QA SP. The two determinations must meet the “single operator” precision of 0.009 for AASHTO T-166, for each test. Use this value in calculations requiring a G_{mb} value. Condition loose asphalt mixture samples for a minimum of two hours before testing to allow for binder absorption, unless otherwise allowed. Time begins when the binder is introduced to the aggregate. Condition all material used for acceptance tests. Match test condition time for material used for acceptance tests to the field conditions of the field compacted mixture. The Contractor must demonstrate to the Engineer that absorption is complete in less than two hours in the field in order to shorten condition time. Do not over-condition the material by keeping the samples at an elevated temperature.

Production Air Voids, V_a . Calculate air voids at the frequency shown in Table 106.03-1 of the QA SP and plot the results on a control chart. Target 4.0 percent air voids during production paving. Calculate V_a by using the values of the G_{mm} and the G_{mb} determined above.

Voids in Mineral Aggregate, VMA. Calculate VMA at the frequency shown in Table 106.03-1 of the QA SP and plot the results on a control chart. The Contractor should target the VMA value from the C-JMF during production paving. Calculate VMA by using the G_{mb} value determined from samples taken during production paving and the G_{sb} value determined for the mix design. Determine Percent Aggregate Content, P_s , by subtracting the Percent Binder Content, P_b , from 100 from samples taken during production paving. The Department will not recalculate G_{sb} during the project.

Voids Filled With Asphalt, (VFA). Calculate VFA and plot the results at the frequency shown for VMA and V_a in Table 106.03-1 of the QA SP using the values for VMA and V_a . The Contractor should take action to correct mixtures that do not remain within the range specified in Table 1.

Dust to Binder Ratio, DP. Calculate Dust to Binder Ratio or Dust Proportion using the value for P_b , the value for minus # 200, and the value for G_{mm} and plot the results at the frequency shown for VMA and V_a in Table 106.03-1 of the QA SP. The Contractor should take action to correct mixtures that do not remain within the range specified in Table 1.

Production Limits. Apply the limits shown in Table 405.03-5 to the production paving test properties and plot on control charts:

Table 405.03-6 - Production Paving Quality Limits

Quality Characteristic	Limits
SP 2 mixtures	
No.4 sieve and larger sieves, %	C-JMF value \pm 5.0 ^a
No. 8 to No. 30 sieves, %	C-JMF value \pm 4.0 ^a
No. 50 to No. 100 sieves, %	C-JMF value \pm 3.0a
No. 200 sieve and smaller sieves, %	C-JMF value \pm 1.5 ^a
Asphalt Binder Content, %	C-JMF value \pm 0.3
SP 3 – SP5 mixtures	
Laboratory Air Voids, % N_{design}	4.0 \pm 1.0

VMA, % at Ndesign	703.05 minimum value - 0.05 ^b
VFA	Table 405.02-1 value \pm 5
Dust to Binder Ratio, DP	Table 405.02-1 value \pm 0.1

^a in no case shall the upper and lower specification limits be outside the control points specified in Subsection 703.05

^b For purposes of Quality Analysis calculations

Document corrective actions taken on summary sheets. Include tests and plots in the project files.

- K. Spreading and Finishing.** Place the mixture upon an Engineer approved surface. Use pavers to distribute the mixture over the entire width or over a partial width as practical. Do not extend partial width paving beyond one day's production unless otherwise approved by the Engineer. Unless otherwise specified, place Superpave HMA in a single lift.

Use pavement marking tape to temporarily mark roadway centerline on pavements being used by traffic in accordance with 626.03.

Equip the paver with a shoe on the outside of the paver to provide slopes as follows unless otherwise shown on the plans:

The Engineer will allow an 18 in wide shoe for depths 0.2 ft or less on initial pavement placement. The shoe must be 24 in wide for depths greater than 0.2 ft. The shoe must be 24 in wide on pavement overlays.

- L. Compaction.** Compact Superpave HMA as quickly as possible using rollers after placing and in accordance with 306. Provide vibratory steel wheel, or pneumatic tire type rollers, in good condition, capable of reversing without backlash, and operate at speeds slow enough to avoid displacement of the mixture. Use the number and compactive force of rollers that is sufficient to compact the mixture as specified in this Subsection. Do not use equipment which results in excessive crushing of the aggregate. The Engineer will reject rollers producing pickup wash-board, uneven compaction of the surface or other undesirable results.

Rolling equipment to be used and its relative position in the compaction sequence is the Contractor's option, provided specification densities and smoothness are attained. Independently operate each roller used. Rolling equipment used for the acceptance test strip should be the same type and weight as will be used for subsequent compaction of the pavement. To accommodate full production, the Contractor may use additional rollers beyond the number used in construction of the test strip.

Do not operate vibratory rollers in the vibratory mode when the internal mix temperature is less than 175 °F or when checking or cracking of the mat occurs at a higher temperature, unless otherwise allowed because WMA is used.

Follow the paver as closely as possible with breakdown rolling. Perform intermediate rolling as near as possible to the optimum temperature for compaction as determined by written recommendation of the supplier of the asphalt product used on the project. Perform finish rolling at as high a temperature as is practical to eliminate marks from previous rolling.

Begin rolling at the sides and proceed longitudinally parallel to the road centerline, with each trip overlapping one-half the roller width, unless otherwise Engineer approved. When paving in echelon abutting a previously placed lane, roll the longitudinal joint first, followed by the regular rolling procedure. On super elevated curves, begin the rolling at the low side and progress to the high side by overlapping of longitudinal passes parallel to the centerline.

Do not displace the line and grade of the edges of the pavement.

Keep the wheels properly moistened with water or water mixed with very small quantities of detergent or other Engineer approved material to prevent adhesion of the mixture to the rollers. Do not use excess liquid. Do not apply diesel fuel, kerosene or other solvents to roller drums or tires to prevent adhesion of the mixture.

Thoroughly compact the mixture with mechanical tampers or other approved compactors along forms, curbs, headers, walls, and other places not accessible to rollers. Remove the mixture from the gutter surface before rolling.

Compact the pavement to a density corresponding to a range between 92.0 percent and 95.0 percent of Maximum Theoretical Density for Classes SP 2 through SP 5 mixes.

Following acceptance test strip approval, pavement density testing for acceptance will be performed by the Department using a gauge with the readings corrected by cores in accordance with AASHTO T 355 or FOP for AASHTO T 343. The Department will use the average Gmm of the test section corresponding to the Contractor's JMF to determine densities for the specified mix production paving. The Contractor is responsible for quality control testing.

The Department will base acceptance for pavement density on the density of cores taken from the finished pavement, when an acceptance test strip is not required.. Obtain five randomly located core samples per FOP for AASHTO R 67, from the compacted Superpave HMA in the presence of the Engineer. The Engineer will determine the random core locations. Immediately submit the cores to the Engineer for testing. The Department will determine the density of the cores according to FOP for AASHTO T 166, Method A or AASHTO T 331. In addition, obtain three randomly located mix samples during placement of the HMA, in the presence of the Engineer, and immediately submit all samples to the Engineer for testing. Obtain the samples in accordance with FOP for AASHTO T 168 (See the QA SP Table 106.03-1 Note 3). The Engineer will randomly locate the mix samples and the Department will test the mix samples to determine the Gmm value in accordance with FOP for AASHTO T 209 or ASTM D6857. The Department will use the average of the three Gmm values to compute in-place density of the cores taken for density acceptance. If paving will be performed in different construction seasons (e.g. bridge approaches), obtain five additional cores from the compacted Superpave HMA and three additional mix samples for density acceptance, as specified, when paving resumes. The Contractor is responsible for quality control testing.

Repair holes left in the pavement by the coring operation at no additional cost to the Department. Do not begin coring until repair methods and materials have been Engineer approved.

M. Joints. Do not roll over the unprotected end of freshly laid mixture unless authorized by the Engineer. Form transverse joints by cutting back on the previous run to expose a vertical edge the full depth of the course.

Slope the cold transverse construction joints open to public traffic at 20H:1V. Remove the sloped surface (ramp) without damage to the base just before paving is resumed. Test the new joint for smoothness as specified in 405.03.P.

Construct end transitions between overlays and the adjoining pavement by milling a wedge out of the adjoining pavement, starting at the surface and continuing into the adjoining pavement on a 200H:1V slope or flatter until a vertical edge equal to 0.15 ft or depth of overlay is reached. Transitions to ramps and crossroads are transverse joints. The milled wedge is a transverse joint when the adjoining pavement is concrete. Mill the wedge from the pavement to be overlaid, with the vertical edge against the concrete when the adjoining pavement is concrete. Taper transitions between overlays and approaches to form a smooth transition while maintaining drainage.

Provide a positive bond, provide density and provide a finish surface to the new mixture at longitudinal joints that is equal in all respects to the mixture against which it is placed. The Engineer may take density tests at longitudinal joints to ensure the integrity of material in the joint area.

Locate the longitudinal joint in the top course at the centerline of the traveled way if the roadway is two lanes wide or at the lane lines if the roadway is more than two lanes wide. On the lower courses stagger the longitudinal joint and offset it 6 in to 1 ft from the centerline of the traveled way if the roadway is two lanes wide or from the lane lines if the roadway is more than two lanes wide. Match the pavement surface across a longitudinal joint with the transverse slope shown on typical sections.

Test joints, except crowns, for smoothness in accordance with Idaho IR-87. Furnish and use an approved 10 ft straight edge. Complete the test and necessary corrections before the material temperature drops below 175 F.

Place longitudinal joints straight and true. Use approved methods to bring back to straight and true all unacceptable deviations. Make adjustments as needed to achieve the specified results.

Obtain Department approval for Superpave HMA mix design(s) prior to the start of any milling operations.

N. Miscellaneous Pavement. Place Superpave HMA miscellaneous pavement in irregular areas such as raised or depressed medians, gores, tapers, radii (excluding approach radii), and tapered paving for guardrail terminal widening. Include areas that taper from 0 ft to 8 ft maximum width and gore areas from roadway shoulders to termini in this work. Do not include pavement widening for installation of guardrail in this work.

O. Leveling Course. Construct the leveling course of Superpave HMA, with a compacted thickness greater than 0.2 ft, in multiple courses.

Place the leveling course on the existing surface in quantities as Engineer approved to accomplish the intended purpose. Use pavers or motor graders, or both, and a sufficient number of pneumatic tire rollers to adequately place and compact the leveling course to the required cross section and grade. Use a steel wheel roller for final rolling if the leveling course is to be used as a wearing course or if a seal coat is to be applied.

When blade laid leveling course is specified, place Superpave HMA in wheel ruts and other surface irregularities. Blade Superpave HMA into the low areas using a motor grader. Normally, two passes is required to fill depressions. Follow each pass of the motor grader with a pneumatic tired roller to provide compaction. Position the blade of the motor grader so that light contact with the existing pavement surface is maintained. The Contractor may dispose of excess coarse aggregate resulting from placing the blade laid leveling course along the edge of the roadway unless otherwise directed by the Engineer.

When machine laid leveling course is specified, place Superpave HMA on the roadway with a paver to restore crown, super elevation, or rideability. Operate the screed close to the existing pavement surface. The Engineer will accept minor surface tears from this operation. Use both pneumatic and vibratory rolling for compaction.

P. Surface Smoothness. Place pavement complying with Schedule II unless otherwise specified.

For Schedule III only, perform pre-paving, quality control, and acceptance surface smoothness testing, analyze the results of this testing, and submit the results to the Engineer. Submit pre-paving results to the Engineer before starting to pave. Before paving, submit a plan to the Engineer showing how Schedule III smoothness will be achieved.

Submit quality control results to the Engineer no later than the next working day following placement.

Should the results of the quality control testing show surface smoothness is not within acceptable specification limits, suspend paving operations until it can be demonstrated that steps taken to modify operations will result in acceptable smoothness.

Perform acceptance testing on the final lift and submit the results to the Engineer before corrective action. Complete acceptance testing within one week of paving completion.

Perform quality control testing in International Roughness Index (IRI). Request to use quality control testing for acceptance before the start of paving.

Acceptance surface smoothness testing must be verified by the Engineer. The profile run must be witnessed by the Engineer and a preliminary copy of the report submitted to the Engineer immediately after the end of the run. The Engineer will not accept the testing unless witnessed by the

Engineer. Submit the profile data in a format suitable for evaluation using Proval or other industry standard software. Do not perform corrective action until the Engineer has approved the analysis.

The Engineer may elect to perform additional testing as verification. Should the results vary from the Contractor's IRI results by more than 10 percent, the Engineer will use the Department's IRI results for acceptance.

Use Class 1 or Class 2 profilers as defined by ASTM E950. Operate profilers in accordance with the manufacturer's instructions and AASHTO R 57. Set the profiler as follows:

- High pass or pre-filter – off or a minimum of 200 ft.
- Bump detection – on
- Dip detection – on
- Resolution – 0.01 inch
- Low Pass Filter – off
- All Other Filters – off

Measure the finished pavement as follows:

1. Test the surface with a 10 ft straight-edge, at locations determined by the Engineer. Identify the locations that vary more than $\frac{1}{4}$ in from the lower edge when the straightedge is laid on finished pavement in a direction parallel with centerline or perpendicular to centerline. Remove the high points that cause the surface to exceed the $\frac{1}{4}$ in tolerance by grinding.
2. Profile the surface as follows:

Profile 3 ft from and parallel to each edge of each traffic lane. The Engineer will use the average of the results for each 0.1-mile section to calculate incentive payments and determine sections requiring corrective action.

The Department requires the pavement to comply with the following surface smoothness schedule requirements:

- a. Where longitudinal grade is 6.5 percent or less, pavement on tangent alignment and pavement on horizontal curves having centerline radius of curve 1,000 ft or more must meet the surface smoothness requirements for the smoothness schedule specified. The Engineer will add consecutive 0.1-mile sections of roadway tested together to obtain the mile section. There will be no overlapping of the 0.1-mile or 1-mile sections to change cumulative test results.

Smoothness Schedule using IRI:

Schedule I Projects: Target IRI values range from 6.0 in. to 7.0 in./0.1-mile. Corrective action required above 9.5 in/0.1-mile.

Schedule II Projects: Target IRI values range from 7.1 in. to 8.0 in./0.1-mile. Corrective action required above 9.5 in/0.1-mile.

Schedule III Projects: Target IRI value range defined as one of the following:

- (1) For sections with a prepaving IRI less than 16.0 in/0.1-mile the final index must not exceed 8.0 in/0.1-mile.
 - (2) For sections with a prepaving IRI of 16.0 in/0.1-mile or greater use the smoother of:
 - i. A 50 percent improvement of the pre-paving index, or
 - ii. a maximum final index of 10.0 in/0.1-mile. Corrective action is required above the target IRI.
- b. The Engineer will exclude acceptance test strips, pavement on horizontal curves having a centerline radius of curve of less than 1,000 ft and pavement within the super elevation transition of such curves or pavement with a grade greater than 6.5 percent from incentive/disincentive payments. Meet the corrective action requirements for the smoothness schedule specified.

3. Profile the pavement to provide continuous uninterrupted profile data. The Department will not apply profile smoothness tolerances and incentive/ disincentive payments to the following:
 - a. Pavement within 50 ft of a transverse joint that separates the pavement from a structure deck, an approach slab, or an existing pavement not constructed under the contract.
 - b. Pavement for approaches and structure decks.
 - c. Roadways with a speed limit less than 40 mph, unless otherwise specified.
 - d. Interstate ramps unless otherwise specified.

Smoothness acceptance for these areas will be in accordance with straight-edge requirements.

Do not profile pavement for approaches.

Operate the profiler at a speed no greater than that recommended by the manufacturer. Calibrate the profiler at the beginning of the project and as needed thereafter.

Grind the finished pavement until it complies with the following smoothness requirements.

Grind individual high points in excess of 0.3-inch within a 25 ft distance or less, as determined by the California Profilograph simulation, until such high points do not exceed 0.3-inch.

After individual high point grinding has been completed, perform additional grinding in sections requiring corrective action to reduce the IRI to a maximum of 8.0 in in any 0.1-mile section along any line parallel with the pavement edge.

Grind parallel to centerline. Extend adjacent grinder passes, within any one ground area, to produce a neat rectangular area having a uniform surface appearance. Make smoothly feathered transitions at transverse boundaries between ground and unground areas. Apply a fog coat to the ground pavement surface in accordance with 408 after grinding has been completed.

Use power-driven grinding equipment that is specifically designed to smooth Portland cement concrete pavement with diamond blades. Use a machine with an effective wheelbase of not less than 12 ft and a cutting width of at least 3 ft. Instead of diamond grinding, the Contractor may use a self-propelled milling machine of the type used for removal of asphalt pavement provided a special milling head is used that is designed to provide a texture similar to diamond grinding. Use a milling head with cutting teeth that do not exceed a spacing of 0.2-inch. Restrict the machine forward speed to 5-feet per minute while milling. Should the texture produced by milling be unsatisfactory, the Engineer will require diamond grinding. Provide grinding or milling equipment of a shape and dimension that does not encroach on traffic movement.

Check the pavement for smoothness after grinding, as specified in this subsection, and make any additional corrections necessary to the pavement to achieve smoothness. Submit to the Engineer a report and graph chart showing compliance of the final surface to the smoothness requirements. The Department will not pay for the cost of grinding or milling, or related work such as fog coat, disposal of milled material, traffic control, flagging, profiling, surface repair of ground or milled areas, and temporary striping.

If correction of the roadway as specified will not produce satisfactory results as to smoothness, or it reduces pavement thicknesses and serviceability, the Engineer may accept the completed pavement and will deduct from monies due or that may become due to the Contractor the sum of \$500.00 for each individual high point or \$3000 for each 0.1-mile section. Under these circumstances, the Engineer's decision whether to accept the completed pavement or to require corrections as described is final.

405.04 Method of Measurement. The Engineer will measure acceptably completed work as follows:

1. Pavements, leveling courses, and asphalts by the ton. The Engineer will not permit batch weights as a method of measurement. The Superpave HMA quantity will be the weight used in the accepted pavement and will include the weight of the aggregate, asphalt, and any additives in the mixture.

2. Anti-stripping additive by the percentage of additive per ton of asphalt.
3. Miscellaneous pavement by the square yard. Final measurement will be based on plan quantities unless these quantities are significantly altered by Engineer authorized changes. Miscellaneous pavement measurement is in addition to the measurement of asphalt and Superpave HMA material.
4. Approaches per each regardless of width or length. Separate mailbox turnouts will be measured as an approach. Mailbox turnouts adjacent to an approach will be considered as part of the approach and no separate measurement will be made. Approach measurements are in addition to the measurement of asphalt and Superpave HMA material.
5. Wedge milling for the transition section by the square yard.

405.05 Basis of Payment. The Department will pay for accepted quantities at the contract unit price as follows:

Pay Item	Pay Unit
Superpave HMA Pavement Class SP-_____	Ton
Superpave HMA Pavement (including asphalt and additives)	
Class SP-_____	Ton
Leveling Course Class SP-_____	Ton
Leveling Course (including asphalt and additives)	
Class SP-_____	Ton
Asphalt Cement for Superpave HMA Pavement	Ton
Percent Anti-stripping Additive	
for Superpave HMA Pavement_____	TOA
Miscellaneous Pavement_____	SY
Approaches _____	Each
Wedge Milling _____	SY

The Department considers the cost to produce the required aggregate in each stock- pile to accommodate blends incidental and included in the contract unit price for the Superpave HMA contract pay item.

When Superpave HMA includes RAP in any proportion, the Department will not include the asphalt binder contributed by the RAP in the quantity for asphalt and additives when asphalt and additives are paid for separately.

For each evaluation section the Contractor is entitled to a payment adjustment excluding acceptance test strips and Schedule III surface smoothness projects. An evaluation section is defined as a 0.1-mile per traffic lane; or fraction thereof as applicable. The Department will not pay incentive for pavement on the roadway shoulders, center turn lanes, turn bays, crossovers, tapers or other miscellaneous pavement. The Department will pay incentive in accordance with Table 405.05-1.

**Table 405.05-1 - International Roughness Index
Initial Index in/0.1-mile section**

Payment \$ per 0.1 mi	Schedule I	Schedule II
500	4.0 or less	4.5 or less
300	4.1 to 5.0	4.6 to 6.0
100	5.1 to 6.0	6.1 to 7.0
0	6.1 to 7.0	7.1 to 8.0
-100	7.1 to 7.5	8.1 to 8.5
-300	7.6 to 8.5	8.60 to 9.5
-500	8.6 to 9.5	

Payment \$ per 0.1 mi	Schedule I	Schedule II
-\$500 and corrective action	9.6 or greater	9.6 or greater
-\$300 and corrective action	individual high points	individual high points

The Department will make only one incentive payment per evaluation section. The Department considers an evaluation section to run consecutively from the point paving begins to the point paving is interrupted as shown on the plans such as at bridges, the end of lane paving or areas specifically excluded by the specifications. The Department will prorate partial sections based on their percentage of a full section.

The Department will base incentive payments on initial profiles before any corrective work on the top course of paving.

ON PAGE 227 and 228, SUBSECTION 409.01 - DESCRIPTION *

Delete the table 409.01-1 and 409.01-2 and substitute the following:

**Table 409.01-1
Basic Mix Design Parameters**

Concrete Class in 100 psi (28 Day) ^{(a)(b)(g)}	Minimum Cementitious Content Lb./yd ^{3(c)(d)(e)(f)}	Water to Cement Ratio	Slump in	Air Content Percent
45	660	0.42 maximum	2 maximum	4-7

^{a.}The class of concrete is the specified compressive strength when tested in accordance with applicable tests listed in 409.02.

^{b.}A design value of 5600 psi is specified to achieve the specified compressive strength.

^{c.} Cementitious = Cement + Secondary Cementitious Material (SCM).

^{d.} It may not always be possible to produce concrete of the required strength using the minimum cementitious contents. No separate payment will be made by the Department for additional cementitious material required to meet specified strength.

^{e.} Use SCM meeting the requirements of section 714.

^{f.} It may not always be possible to produce concrete using the minimum SCM content that will ensure mortar bar expansion does not exceed 0.10 percent expansion when tested in accordance with ASTM C1567. If additional SCM is needed to meet mortar bar expansion requirements, the Contractor may add it without a corresponding increase in cement provided the strength requirements are met. Obtain Engineer approval to add lithium or other mitigating measures in order to meet the mortar bar expansion requirement.

^{g.} Concrete class designated as class "F" shall contain SCM. Minimum SCM content varies by product, for fly ash and slag cement (slag) minimum content is 20% by weight of total cementitious material. Fly ash shall not exceed 25% of total cementitious material. Slag shall not exceed 35% of the total cementitious material. Ternary and quaternary blends shall contain a minimum of 20% SCM. Total SCM content shall not exceed 50%.

ON PAGE 232, SUBSECTION 409.02- MATERIALS *

Delete the last test method and substitute following:

Determining the Potential Alkali-Silica Reactivity of Combinations of Cementitious Materials, Lithium Nitrate Admixture and Aggregate (Accelerated Mortar-Bar Method) CRD C662

Add the following:

Standard Test Method for Static Modulus of Elasticity and Poisson's Ratio of Concrete in Compression ... ASTM C 469

Standard Test Method for Length Change of Hardened Hydraulic Cement for Mortar and Concrete ... ASTM C 157

Coefficient of Thermal Expansion of Hydraulic Cement Concrete ... AASHTO T 336

Standard Method of Test for Surface Resistivity Indication of Concrete's Ability to Resist Chloride Ion Penetration ... AASHTO T358 *

Standard Method of Test for Potential Alkali Reactivity of Aggregates and Effectiveness of ASR Mitigation Measures ... AASHTO TP 110 *

ON PAGE 232, SUBSECTION 409.03- CONSTRUCTION REQUIREMENTS

Delete the 2nd, 3rd, and 4th paragraphs (including Parts 7 & 8 on page 233) and substitute the following:

For projects exceeding 2500 cubic yards provide the following to the Engineer at least 60 days in advance of proposed use:

1. The proposed mix design.
2. Copies of test reports.
3. Data.
4. Worksheets.
5. Samples of the proposed aggregate, cement, fly ash and admixtures.
6. "Final set" time with the mix design as measured by AASHTO T 197M / T 197.
7. Mixing water source.
8. Proposed curing compound.
9. Theoretical maximum density.
10. Rate of development of electrical resistivity to 28 days.
11. Modulus of Elasticity at 28 days.
12. Drying shrinkage
13. Coefficient of thermal expansion

Do not produce concrete until the mix design is approved by the Department's Central Laboratory.

For projects less than 2500 cubic yards provide the following at least 14 days in advance of proposed use:

1. The proposed mix design.
2. Copies of test reports.
3. Data.
4. Worksheets.
5. "Final set" time with the mix design as measured by AASHTO T 197M / T 197.
6. Mixing water source.
7. Proposed curing compound.
8. Theoretical maximum density.
9. Rate of development of electrical resistivity to 28 days.
10. Modulus of Elasticity at 28 days.
11. Drying shrinkage
12. Coefficient of thermal expansion

ON PAGE 233, SUBSECTION 409.03- CONSTRUCTION REQUIREMENTS *

Delete the 4th full paragraph and substitute the following:

Use the cement, fly ash, and other mitigative additives proposed for use in the mix design to produce laboratory specimens in accordance with ASTM C1567 or AASHTO TP 110. If lithium nitrate is used to mitigate ASR, perform CRD C 662. When performing ASTM C1567 or CRD C662 limit mortar bar expansion to 0.10 percent or less. When using AASHTO TP 110 limit expansion to 0.02 percent or less at 56 days or 0.04 percent or less at 112 days. Perform testing on the coarse and fine aggregates together or separately. If testing is performed on the coarse and fine aggregates together, report the blend percentage on the test and be within plus or minus 2 percent of the blend percentage used in the mix design. If tested separately, use mitigation based on the aggregate requiring the most mitigation.

ON PAGE 234, SUBSECTION 409.03- CONSTRUCTION REQUIREMENTS *

Delete the first 2 paragraphs and substitute the following:

If the contract does not require fly ash, the Contractor may provide a mix design subject to the same requirements as if the contract requires fly ash. Do not vary CaO content more than 2 percent above that used for ASTM C1567 or AASHTO TP 110 testing where fly ash is used in the concrete mix for ASR mitigation. If the fly ash has a CaO content greater than 2 percent above the fly ash used for testing, additional ASTM C1567 or AASHTO TP 110 testing at the higher CaO content is required by the Department.

ON PAGE 254, SUBSECTION 409.03- CONSTRUCTION REQUIREMENTS *

Add after the last paragraph of O Multiple Lane Construction part 1:

When using maturity testing, validate the first field placement and every 14 calendar days or 20,000 cubic yards, whichever is greater, thereafter. Cure cylinders used for validation testing using the same procedures as used in developing the initial maturity-strength relationship. When initially validating the maturity curve, validate a minimum of two points on the maturity curve, at least one of which shall be at a period of less than 7 days. A minimum of a single point occurring at less than 7 days is required for subsequent validation. A maturity curve will be considered valid if the validation points are within 10 percent of the original maturity curve.

ON PAGE 255, SUBSECTION 409.03- CONSTRUCTION REQUIREMENTS *

Add after the first partial paragraph

When using maturity testing, validate the first field placement and every 14 calendar days or 20,000 cubic yards, whichever is greater, thereafter. Cure cylinders used for validation testing using the same procedures as used in developing the initial maturity-strength relationship. When initially validating the maturity curve, validate a minimum of two points on the maturity curve, at least one of which shall be at a period of less than 7 days. A minimum of a single point occurring at less than 7 days is required for subsequent validation. A maturity curve will be considered valid if the validation points are within 10 percent of the original maturity curve.

ON PAGE 266-268, SUBSECTION 502.01 – DESCRIPTION *

Delete the first paragraph and tables 502.01-1 and 502.01-2 and substitute the following:

A. Provide the classes of concrete specified in Table 502.01-1 where required on the plans.

Table 502.01-1

Basic Mix Design Parameters			
Concrete Class in (100psi) (28 day)^(a)	Minimum Cementitious Content lb./yd^{3(b)(c)}	Max. Water Cement Ratio	Air Content Percent
45 and greater (d)(e)(f)(g)	660	.44	0-6.0
35 to less than 45 (d)(e)(f)(g)	560	.44	0-6.0
30	560	.49	6.5 ±1.5
Seal Concrete	660	.60	0-6.0

^a Numerical part of class designation is the specified compressive strength when tested in accordance with applicable test listed in 502.02.

^b Cementitious =Cement + Secondary Cementitious Materials (SCM), if used or specified.

^c It may not always be possible to produce concrete of the specified compressive strength using the minimum cement and SCM contents. No separate payment will be made by the Department for additional cementitious material required to meet the specified compressive strength

^d Concrete classes designated as “A” shall have an air content of 6.5±1.5 percent.

^e Concrete classes designated as “C” shall have a maximum water cement ratio of 0.40, (water reducer required), and air content of 6.5±1.5 percent.

^f Concrete classes designated as class “F” shall contain SCM. Minimum SCM content varies by product, for fly ash and slag cement (slag) minimum content is 20% by weight of total cementitious material (cement + SCM). Fly ash shall not exceed 25% of total cementitious material. Slag shall not exceed 35% of the total cementitious material. For Silica Fume minimum content is 7.5% by weight of total cementitious material. Silica fume shall not exceed 10% of the total cementitious material. Ternary and quaternary blends shall contain a minimum of 20% SCM. Total SCM content shall not exceed 50%.

^g Provide SCM meeting the requirements of section 714.

ON PAGE 268 & 269, SUBSECTION 502.01 – DESCRIPTION

Delete the paragraph which is on both pages and substitute the following:

Provide Class 30 concrete and use Nos. 2a, 2b, or 3 size coarse aggregate or combined gradation Nos. 2c or 3c aggregate gradations except for Class 40 and above concrete and prestressed girders, unless otherwise specified. Use Nos. 2a or 2b size coarse aggregate or No. 2c combined aggregate gradation for Class 40 concrete and above and prestressed girders. Minimum cementitious material content may be reduced 20 percent by the Contractor when using a combined gradation.

ON PAGE 272, SUBSECTION 502.02 – MATERIALS

*

Delete the first test method and substitute the following:

Making and Curing Concrete Test Specimens in the Field....AASHTO T 23
(Except cylinders shall be molded only in single use molds made of plastic)

Standard Method of Test for Surface Resistivity Indication of Concrete's Ability to Resist Chloride Ion Penetration.....AASHTO T358

*

Delete the fifth test method and substitute the following:

Making and Curing Test Specimens in the Laboratory.... AASHTO R 39
(Except cylinders shall be molded only in single use molds made of plastic)

Add the following:

Standard Test Method for Determining the Potential Alkali-Silica Reactivity of Combinations of Cementitious Materials and Aggregate (Accelerated Mortar-Bar Method)..... ASTM C 1567

Determining the Potential Alkali-Silica Reactivity of Combinations of Cementitious Materials, Lithium Nitrate Admixture and Aggregate (Accelerated Mortar-Bar Method) CRD C662

Standard Method of Test for Potential Alkali Reactivity of Aggregates and Effectiveness of ASR Mitigation Measures AASHTO TP 110 *

ON PAGE 273, SUBSECTION 502.03 – CONSTRUCTION REQUIREMENTS *

Delete the last sentence of the first full paragraph:

ON PAGE 274 & 275, SUBSECTION 502.03 – CONSTRUCTION REQUIREMENTS *

Delete the 5 paragraphs after table 502.03-3 and substitute the following:

The Department requires that the laboratory specimens, produced in accordance with ASTM C1567, AASHTO TP 110 or CRD C 662, be prepared using the cement, fly ash, and other mitigative additives proposed for use in the mix design. Determine the lithium nitrate dosage per CRD C 662 when using lithium nitrate for ASR mitigation. Do not allow expansion of mortar bars to exceed 0.10 percent with the addition of fly ash, slag, or other additives when tested in accordance with ASTM C1567 or CRD C662. Do not allow the miniature concrete prisms to exceed 0.02 percent at 56 days or 0.04 percent expansion at 112 days when tested in accordance with AASHTO TP 110. The Contractor may test the coarse and fine aggregates together or separately. If testing is performed on the coarse and fine aggregates together, report the blend percentage on the test and be within plus or minus 2 percent of the blend percentage used in the mix design. When tested separately, base mitigation actions on the aggregate requiring the most mitigation.

Ensure the fly ash used in the concrete mix for ASR mitigation does not have a CaO content more than 2 percent above the CaO content of the fly ash used for ASTM C 1567 or AASHTO TP 110 testing. If the fly ash used in the concrete mix for ASR mitigation has CaO content greater than 2 percent above the fly ash used for testing, the Department will require additional ASTM C1567 or AASHTO TP 110 testing at the higher CaO content.

If fly ash is used only as a mineral admixture, determine the dosage of lithium nitrate based on CRD C 662 testing without fly ash.

ON PAGE 280, SUBSECTION 502.03 – CONSTRUCTION REQUIREMENTS *

Delete the first paragraph of Part 2 Plans and substitute the following:

Submit falsework or formwork drawings and design calculations in pdf format. Include on each drawing and calculation sheet the key number, and contract drawing number. Ensure working drawings identify materials used, including grades of lumber, in sufficient detail to permit accurate checking.

ON PAGE 287, SUBSECTION 502.03 – CONSTRUCTION REQUIREMENTS

Add to 502.03.E.4.h
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Do not stamp concrete with company logo, dates, patterns, etc. unless otherwise shown on the plans.

ON PAGE 288, SUBSECTION 502.03 – CONSTRUCTION REQUIREMENTS

*

Add after the third full paragraph

When using maturity testing, validate the first field placement and every 1,000 cubic yards thereafter. Cure cylinders used for validation testing using the same procedures as used in developing the initial maturity-strength relationship. When initially validating the maturity curve, validate a minimum of two points on the maturity curve, at least one of which shall be at a period of less than 7 days. A minimum of a single point occurring at less than 7 days is required for subsequent validation. A maturity curve will be considered valid if the validation points are within 10 percent of the original maturity curve.

ON PAGE 289, SUBSECTION 502.03 – CONSTRUCTION REQUIREMENTS

*

Delete from Table 502.03-5 the Percent of Design Strength of “8” for Bridge decks, top slabs of concrete box culverts or stifflegs and substitute “80”.

Add in Table 502.03-5 part 2 Subsequent Loading of structural element the following:

*

Erecting girders on pier caps 7 days min. 100% of design strength

ON PAGE 291, SUBSECTION 502.03 – CONSTRUCTION REQUIREMENTS

Change 1/8 inch in the fourth sentence of the first full paragraph to 0.02 inches.

ON PAGE 294, SUBSECTION 502.03 – CONSTRUCTION REQUIREMENTS

Delete the 5th and 6th paragraphs and substitute the following:

Provide calibrated temperature recording devices with a range of 20°F to 212° F for steam cured concrete and a range of 20°F to 160°F for all other concrete.

Continuously record temperatures for at least 24 hours. Provide a sufficient number of recording devices to keep adequate records of temperatures.

ON PAGE 298, SUBSECTION 502.03 – CONSTRUCTION REQUIREMENTS

Delete “X-System 2” from column B of Table 502.03-7 – Cure Methods.

ON PAGE 301, SUBSECTION 502.05 - BASIS OF PAYMENT

Delete the last sentence of the last full paragraph and substitute the following:

Pay for concrete placed in the superstructure as Concrete Class __ Schedule No. 2 by “plan quantity” as specified in 109.01.

ON PAGE 302, SUBSECTION 502.05 - BASIS OF PAYMENT

Add the following:

Surface Resistivity Price Adjustment. The Department will make the following price adjustment to the contract unit price for each lot of Schedule No. 2 concrete meeting the following surface resistivity requirements when measured by AASHTO T358 at 28 days. *

Table 502.05-1 Surface Resistivity Price Adjustment

Price /yd ³	Surface Resistivity, kΩ-cm (4X8)	Surface Resistivity, kΩ-cm(6X12)
\$2.50	>21.0, ≤37.0	>16.5, ≤29.0
\$5.00	>37.0	>29.0

ON PAGE 309, SUBSECTION 504.01- DESCRIPTION *

Delete the text of Part F - Shop Plans and substitute the following:

Submit working drawings for fabricating the steel in pdf format. Include on each drawing and calculation sheet the project name as shown on the plans, District-County-Route, bridge number, contract number, and contract drawing number and key number.

Submit welding procedures in pdf format for approval with shop drawings. Include the type of equipment to be used, electrode selected, preheat requirements, base materials, and joint details. When the procedures are not prequalified by AWS or AASHTO, submit evidence of qualification tests.

The Department accepts only the nature and scope of the details without validating dimensions in approving working drawings.

Do not make changes in any drawing after Engineer approval, without the Engineer's written approval.

Provide as-built shop drawings in pdf format.

ON PAGE 322, SUBSECTION 504.03- CONSTRUCTION REQUIREMENTS

In Table 503.03-2 delete the tension value “5450” for Bolt size 1.375 inch under ASTM A325 and substitute with “85450”.

ON PAGE 324, SUBSECTION 504.03- CONSTRUCTION REQUIREMENTS

- In Table 504.03-3 Turn-Of-Nut Tightening Method, first column:
- In column heading, change "Bolt Length¹" to read "Bolt Length^{2,3}"
 - In first column, second row, change "1 ≤ 4D" to read "≤ 4D"
 - In first column, third row, change "4D ≤ 8D" to read "4D to ≤ 8D"
 - In first column, fourth row, change "8D ≤ 12D" to read "8D to 12D"

Below the Table, in Note 3, move the “,” sign from behind the word “determine” to behind “12D”.

ON PAGE 336, SUBSECTION 505.03- CONSTRUCTION REQUIREMENTS

Delete the formula from 505.03.R and substitute the following:

$$D = C \times E^{0.5}$$

ON PAGE 338, SUBSECTION 506.03- CONSTRUCTION REQUIREMENTS *

Delete from the first sentence of part A “Submit for Engineer review and approval,” and substitute “Submit in pdf format for Engineer approval.”

Delete the last sentence of the first paragraph and substitute the following:

Provide as-built shop drawings in pdf format.

ON PAGE 342, SUBSECTION 506.03- CONSTRUCTION REQUIREMENTS

Delete the T0 formula and substitute the following:

$$T_0 = T_x \times e^{UA+Kl}$$

Delete the definition of e and substitute the following:

e = 2.7183 (base of Naperian logarithms)

ON PAGE 351, SUBSECTION 509.01- DESCRIPTION

Delete B in the first paragraph.

ON PAGE 353, SUBSECTION 509. 03- CONSTRUCTION REQUIREMENTS

*

Delete the 2nd and 3rd paragraphs and substitute the following:

For aggregates with an AASHTO T 303 expansion greater than 0.50 percent:

1. Test in accordance with ASTM C 1567, AASHTO TP 110 or CRD C 662, using the cement, fly ash, and other mitigative additives proposed for use in the mix design. Determine the lithium nitrate dosage per CRD C 662 when using lithium nitrate for ASR mitigation. Do not allow expansion of mortar bars to exceed 0.10 percent with the addition of fly ash, slag, or other additives when tested in accordance with ASTM C1567 or CRD C662. Do not allow the miniature concrete prisms to exceed 0.02 percent at 56 days or 0.04 percent expansion at 112 days when test in accordance with AASHTO TP 110. The Contractor may test the coarse and fine aggregates together or separately. If testing is performed on the coarse and fine aggregates together, report the blend percentage on the test and be within plus or minus 2 percent of the blend percentage used in the mix design. When tested separately, base mitigation actions on the aggregate requiring the most mitigation. Or,

ON PAGE 357 & 358, SUBSECTION 510.03- CONSTRUCTION REQUIREMENTS

Delete part B and substitute the following:

B. Equipment. Use an Engineer approved power-driven finishing machine complying with the following requirements for finishing all areas of work with a width equal to or greater than 14'.

Have at least two hand-operated, spud type internal vibrators available at all times for use as Engineer directed. Submit to the Engineer a request for approval of the specific equipment to be used at least 15 calendar days before the start of work. Do not begin placing deck concrete until the screed and placing procedure is Engineer approved.

Provide a self-propelled finishing machine capable of forward and reverse movement under positive control for placing, striking off and finishing the bridge deck surface, with provisions for raising screeds to clear the surface. Equip the machine with vibrating screeds designed to consolidate the modified composition. The Department requires the vibration frequency be variable with positive control between 3,000 and 11,000 vpm and the bottom face of the screeds be at least 4 in wide and be metal covered. Provide screeds with positive control of the vertical position. Equip the finishing

machine with one or more rollers, augers, and 1,500 or 2,500 vpm vibratory pans. Provide a Bid-Well 2450, or equivalent finishing machine. Modification to the Bid-Well 2450 or equivalent is subject to Engineer approval.

"Texas", "Allen", or "Bunyon" type screeds will not be permitted, unless Engineer approved for small and/or irregular areas.

ON PAGE 360, SUBSECTION 510.03- CONSTRUCTION REQUIREMENTS *

Add after 1st sentence in 1st paragraph under Silica Fume:

Provide a visible recording meter equipped with a ticket printout to show the quantity accurately.

Add to the 2nd paragraph under Silica Fume:

“,unless Engineer approved”

Delete the 4th paragraph and substitute the following: *

Do not exceed 6 CY of silica fume concrete on the truck mixer.

Delete the last sentence of the fifth paragraph and substitute the following: *

Obtain Engineer approval to use a set stabilizer if haul times exceed 1 hour and 15 minutes. If a set stabilizer is used the mixing revolutions may be increased to 500 revolutions and discharge time increased to 3 hours.

ON PAGE 363, SUBSECTION 510.03- CONSTRUCTION REQUIREMENTS

Add the following:

When smoothness grinding is enforced, seal the ground areas with an approved sealer.

ON PAGE 363, SUBSECTION 511.02 - MATERIALS

Delete " Fabric Type B System.....718.02" and substitute " Fabric..... Type B System.....718.08"

ON PAGE 365, SUBSECTION 511.03 - CONSTRUCTION REQUIREMENTS

In the second sentence of 511.03-B, last paragraph, delete "0.06 gal yd²" and substitute " 0.06 gal/yd²"

ON PAGE 370, SUBSECTION 601.03 - CONSTRUCTION REQUIREMENTS *

Delete second paragraph

ON PAGE 372, SUBSECTION 603.02 – MATERIALS

Delete the last line and substitute the following:

Polypropelene pipe706.19

ON PAGE 374, SUBSECTION 604.02 – MATERIALS

Delete the word “baskets” in part 4 and substitute “gaskets”.

ON PAGE 375, SUBSECTION 605.02 – MATERIALS

Add after the last material listed.

Polypropelene pipe706.19

ON PAGE 377, SUBSECTION 606.02 – MATERIALS

Delete the following:

Fittings for polyethylene Drainage TubingASTM F405
Rodent Protection Devices for Trench drainASTM F4499

And substitute:

Fittings for polyethylene Drainage Tubing706.20
Rodent Protection Devices for Trench drain.....706.21

ON PAGE 379, SUBSECTION 606. 03 - CONSTRUCTION REQUIREMENTS *

Delete second paragraph of part C and substitute the following:

Install rodent protection devices for outlet pipes and mark them with a witness post as specified in 618 bearing the letters UD on white reflective sheeting.

ON PAGE 380, SUBSECTION 607. 03 - CONSTRUCTION REQUIREMENTS *

Delete the second paragraph.

ON PAGE 381, SUBSECTION 608. 03 - CONSTRUCTION REQUIREMENTS *

Delete the second paragraph.

ON PAGE 386, SUBSECTION 611.03 - CONSTRUCTION REQUIREMENTS *

Delete the first paragraph

ON PAGE 386, SUBSECTION 611.04 - METHOD OF MEASUREMENT

Delete the text of this subsection and substitute the following:

The Engineer will measure acceptably completed work by the each including the wing braces and posts. The distance between the posts will be excluded from measurement for fence.

ON PAGE 386, SUBSECTION 611.05 – BASIS OF PAYMENT

Delete the pay item “ ___ Cattle Guards, Type ___ ” and substitute “Cattle Guard, Type ___ ”

**ON PAGE 386 THRU 394, SECTION 612 – GUARDRAIL; SECTION 613 – SIDEWALKS;
SECTION 614 – URBAN APPROACHES; AND SECTION 615 – CURB AND GUTTER**

Delete these Sections and substitute the following:
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SECTION 612 - GUARDRAIL AND CONCRETE BARRIER

612.01 Description. Provide and install guardrail and concrete barrier.

612.02 Materials. Provide materials as specified in:

Concrete	502 (for Concrete Barrier)
Non-Structural Concrete	509
Metal Reinforcement	503
Guardrail and Hardware	708.14
Wood Guardrail Posts and Wood Blockouts	710.03
Steel Guardrail Posts	708.07

612.03 Construction Requirements.

A. **Guardrail.** Provide galvanized steel W-beam or thrie-beam guardrail.

Space posts as shown on the plans, set plumb and to established lines and grades. Place backfill material in layers and thoroughly tamp. Boring of wood posts should be done before treating. The Department will permit field boring provided the hole is treated with a wood preservative as specified in 710.09 before driving the bolts.

The Contractor may drive the posts if it can be done without damage to posts, pavement, shoulders, or adjacent slopes. If pilot holes are necessary to prevent such damage, fill remaining voids between post and soil with dry sand or pea gravel. Remove, replace or reinstall misaligned, loose, or damaged posts and repair damage to the existing pavement, shoulders or adjacent slopes at no additional cost to the Department.

B. **Concrete Barrier.**

Cure concrete barrier as specified in 502.03.

Pre-cast concrete barrier units upside down to include connector and transition section. Finish the concrete on precast and cast-in-place concrete barrier with an ordinary surface finish as specified in 502.03. Set concrete barrier to the line and grade shown on the plans.

612.04 Method of Measurement. The Engineer will measure acceptably completed work as follows:

1. Concrete barrier, guardrail, and guardrail median barrier will be by the foot not including terminals.
2. Guardrail terminals, concrete terminal Type A, concrete parapet connector, and concrete barrier connector will be per each.

612.05 Basis of Payment. The Department will pay for acceptable quantities at the contract unit prices as follows:

Pay Item	Pay Unit
Guardrail	ft
Guardrail Median Barrier	ft
Guardrail Terminal Type ____	Each
Concrete Barrier	ft
Concrete Terminal Type A	Each
Concrete Parapet Connector	Each
Concrete Barrier Connector	Each
Cast-in-place Concrete Barrier	ft

Terminal plates, spacers, additional posts, blockouts and hardware as shown on the plans are incidental and the cost included in the contract unit prices for terminals.

SECTION 613 - CRASH CUSHIONS

613.01 Description. Provide and install crash cushion.

613.02 Materials. Provide crash cushion with pad or foundation as shown on the plans, as shown on the Crash Cushion and Roadside Terminal Categorization Charts, and as approved through the QPL. Provide materials as specified:

Non-Structural Concrete	509
Reinforcing Steel	708.02

613.03 Construction Requirements. Perform the following as shown on the plans:

Assemble and install crash cushion and pad or foundation in accordance with the details shown on the plans and the manufacturer’s installation instructions. Obtain assembly and installation information for crash cushions from the manufacturer. Provide an installation and repair manual specific to the installed crash cushion. Provide and install self-adhesive object marker sheeting to the nose of the crash cushion or provide object marker for each crash cushion.

613.04 Method of Measurement. The Engineer will measure acceptably completed work per each installation.

613.05 Basis of Payment. The Department will pay for acceptable quantities at the contract unit prices as follows:

Pay Item	Pay Unit
Crash Cushion, Sacrificial - Sand	Each
Crash Cushion, Sacrificial - Water Filled	Each
Crash Cushion, Sacrificial - Metal	Each
Crash Cushion, Partially Reusable	Each
Crash Cushion, Low Maintenance	Each

Crash cushion pad, transitions, and object marker are incidental and the cost included in the contract unit prices for crash cushions.

SECTION 614 – SIDEWALKS, DRIVEWAYS, AND CURB RAMPS

614.01 Description. Construct sidewalks, driveways, and curb ramps.

614.02 Materials. Provide materials as specified in:

Non-Structural Concrete	509
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Use Class 30 Concrete.

Use detectable warning surfaces consisting of truncated domes aligned in a square or radial pattern as shown on the plans. Ensure that the color of detectable warning surfaces contrast visually with adjacent curb and gutter, street, or sidewalk, either light-on-dark or dark-on-light.

614.03 Construction Requirements. Grade and compact the subgrade to 90 percent of the maximum dry density as determined by AASHTO T 99.

Compact aggregate base with at least two passes of a lightweight mechanical tamper, roller, or vibratory system.

Provide Portland cement concrete as specified in 509 with the following exceptions:

1. Float-finish the concrete so the surface is slightly rough, but uniform. Work the slab edges and joints with a ¼ in radius edging tool. Correct any honey-combed or rough spots using mortar consisting of one part cement and two parts Engineer approved sand immediately after removing the forms.
2. Place, shape, and compact earth or other Engineer approved material against the edge of the sidewalk or driveway.
3. Construct joints as shown on the standard drawings.
4. Cure as specified in 502.03.J.
5. Protect the concrete from damage during freezing weather as specified in 502.03.G.

Locate the detectable warning surface as shown in the Plans and in accordance with the manufacturer’s installation instructions. Ensure that the detectable warning surface is securely embedded in the concrete.

614.04 Method of Measurement. The Engineer will measure acceptably completed work as follows:

1. Sidewalks will be by the square yard.
2. Driveways will be by the square yard.
3. Curb ramps will be by the square yard.

614.05 Basis of Payment. The Department will pay for acceptable quantities at contract unit prices as follows:

Pay Item	Pay Unit
Sidewalk.....	SY
Driveway.....	SY
Curb Ramp.....	SY

Aggregate base will be paid as specified in 303 when an item is included.

Detectable warning surfaces are incidental and the cost included in the contract unit price.

When the contract does not include contract pay items for curb ramp related work, the Department considers this work incidental and the cost included in the curb ramp pay item.

SECTION 615 - CURB AND GUTTER

615.01 Description. Construct curb, gutter, curb and gutter, or traffic separators.

615.02 Materials. Provide materials as specified in:

Non-Structural Concrete	509
Superpave Hot Mix Asphalt.....	405
Aggregates	703
Reinforcing Steel	708.02

Use Class 30 concrete or use ½ in Nominal Maximum Aggregate Size (NMAS) SP2 or SP3 non-structural mixture in accordance with 405.

615.03 Construction Requirements.

Curb, gutter, curb and gutter, and traffic separators may be cast-in-place Portland cement concrete. Curb and traffic separators may be pre-cast Portland cement concrete. Curb may be asphalt concrete.

Construct contraction joints in Portland cement concrete at 10 ft intervals to a minimum depth of 2 in. Provide a light broom finish. Cure concrete immediately after finishing as specified in 502.03.J.

When pre-cast, cast curb in pieces at least 5 ft, but no more than 10 ft in length. Provide a smooth, glassy finish. Install pre-cast curb on a smooth, compacted surface.

Tack the roadway surface where asphalt concrete curb will be constructed.

Place Engineer approved backfill material in layers behind curbs and compact.

615.04 Method of Measurement. The Engineer will measure acceptably completed work as follows:

1. Curb and curb and gutter will be by the foot along the face of the curb.
2. Gutter and traffic separator will be by the foot along the centerline of the units.

No deductions in length will be made for embankment protectors, catch basins, inlets, driveways, or curb ramps installed in the curb, gutter, or curb and gutter.

615.05 Basis of Payment. The Department will pay for acceptable quantities at the contract unit prices as follows:

Pay Item	Pay Unit
Curb, Type ____	ft
Gutter, Type ____	ft
Curb and Gutter, Type ____	ft
Traffic Separator, Type ____	ft

The Department will pay for the asphalt mix and base under the appropriate contract items in 405 and 300.

The Department considers excavation, backfill, reinforcing steel, and diluted emulsified asphalt for tack coat incidental and the cost included in the contract unit price of curb and gutter items.

ON PAGE 394 - 399, SUBSECTION 616.03 – CONSTRUCTION REQUIREMENTS *

Delete entire section and substitute the following:

SECTION 616 - SIGNS AND SIGN SUPPORTS

616.01 Description. Provide and install signs and sign supports.

- Type B Signs** – Sheet aluminum
- Type C Signs** – Extruded aluminum panels
- Type E Signs** – HDO plywood

616.02 Materials. Provide materials as specified in:

Structure Excavation and Compacting Backfill	210
Concrete	502
Structural Metals	504
Non-Structural Concrete	509
Steel and Aluminum Sign Supports	708.17
Hardware for Signs	708.18
Extruded Aluminum.....	708.26
Sheet Aluminum	708.27
Wood Sign Posts	710.02
Plywood for Type E Signs	712.01
Retroreflective Sheeting.....	712.02
Silk Screen Opaque Inks	712.07
Silk Screen Transparent Inks	712.08
Direct Applied Non-Reflective Sheeting and Transparent Films	712.09

Use 502 Concrete, Class 40A for overhead sign bridges, overhead cantilever sign structures, and tee sign structures. Use 509 Concrete, Class 30 for other sign support foundations.

Submit for Engineer approval a list of materials proposed for installation.

616.03 Construction Requirements.

A. Sign Types. Construct signs as follows:

Type B – 0.080” minimum thickness sheet aluminum with retroreflective sheeting background and a digitally printed, silk screened ink, direct applied retroreflective sheeting, or direct applied non-reflective sheeting legend and border. Remove burrs and sharp edges after fabrication.

Type C – Extruded aluminum panels with retroreflective sheeting background and a direct applied retroreflective legend and border. Use on multiple post signs, overhead sign bridges, cantilever sign structures, or tee sign structures.

Type E – ½ in or ⅝ in HDO plywood with retroreflective sheeting background and a digitally printed, silk screened ink, direct applied retroreflective sheeting, or direct applied non-reflective sheeting legend and border. Use ½ in thickness for signs smaller than 96”x48”. Use ⅝ plywood for signs 96”x48” or larger. Fill and sand voids in edges with wood filler then apply edge sealer

B. Sign Sheeting. Apply sheeting and screen printing as follows:

- **Cleaning** – Clean substrates, background sheeting and film per manufacturer’s recommendations before application of additional sheeting and films. Do not use cleaners that damage the surface.
- **Butt Splices** – Use a maximum of one butt splice placed vertically or horizontally with a 1/32 inch or smaller gap on signs larger than 24 inches wide or on 12 inch extrude aluminum panels. Ensure that the color and orientation of the sheeting match.
- **Pop Rivets** – Pop rivets may be used to attach Logo sign panels to a Specific Service Sign. Pop rivets may be used to attach Route Shields to an existing highway sign.
- **Orientation** – Orient retroreflective sheeting per manufacturer’s recommendations.
- **Adherence** – Ensure that sheeting is free of cracks, discoloration, air pockets, or other non-adherence.
- **Screen Printing** – Screen print sign legends using transparent inks in conformance with the sheeting manufacturer’s Matched Component System (MCS). Provided screen printed items with a uniform, smooth regular outline.
- **Cutting and Plotting** – Provide letters, numbers, borders, and symbols with a smooth regular outline.
- **Finish** – Trim sheeting flush with the sign edges. Ensure that sheeting on extruded aluminum is wrapped into the sheeting groove.
- **Storage and Shipping** – Store and ship finished signs with separation paper between the sign faces. Ensure that not more than two signs are stacked horizontally. Vertically store and ship when there are more than two signs.
- **Retroreflectivity** – Ensure that sheeting meets minimum retroreflectivity requirements. Repair or replace devices found to be damaged or defective.

C. Sign Supports.

1. **Ground Mounted Signs** – Construct ground mounted signs as shown on the plans and as follows:
 - a. Risk Category – Low
 - b. Fatigue Category – Not Applicable
2. **Overhead Sign Bridges, Cantilever Sign Structures, and Tee Sign Structures** – Provide plans and design calculations that are sealed by a Professional Engineer licensed in the State of Idaho. Ensure that the sign structure is designed in accordance with the

AASHTO LRFD Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals as follows:

- a. Risk Category – Typical
- b. Fatigue Category – 1

Before fabrication, submit shop drawings and design calculations in pdf format for Engineer approval. Allow 10 working days for review and approval.

Provide as-built shop drawings in pdf format.

Ensure that welds are performed as specified in 504.03.M.

- D. Foundations.** Construct foundations and place, grade, and compact backfill and surface material. A formed cylindrical or square foundation may be used where a foundation hole cannot be augured. If solid rock is encountered, drill and grout reinforcing steel into the rock when Engineer approved.
- 1. Ground Mounted Sign Foundations** – Construct foundations for ground mounted signs as shown on the plans.
 - 2. Overhead Sign Bridges, Cantilever Sign Structures, and Tee Sign Structures** – Install anchor bolts plumb, plus or minus one degree. Use three nuts, two washers on each anchor bolt; one leveling nut and washer below the base plate, two nuts, and one washer above the base plate. Ensure leveling nuts with washer bear against the underside of the base plate before tightening of the top nuts. Tighten the lower top nut beyond snug-tight as specified in Table 616.03-1.

**Table 616.03-1
Nut Rotation beyond Snug Tight**

Anchor Bolt Diameter (in)	F1554 Grade 36	F1554 Grades 55 and 105
< or = 1.5"	1/6 turn	1/3 turn
> 1.5"	1/12 turn	1/6 turn

Tighten the upper top nut against the lower top nut snug-tight. The Department defines snug-tight as either the tightness reached by a few blows from an impact wrench, or the full effort of a man using a 12 in spud wrench. Ensure at least three threads of the anchor bolt are visible above the second nut.

Tighten bolts as specified in 504.03.L.2

Place and compact backfill as specified in 210.

616.04 Method of Measurement. The Engineer will measure acceptably completed work as follows:

1. Signs will be by the square foot to the nearest 0.1 square foot. The sign area is the rectangular shape that encompasses the sign panel, except for triangular signs, which will be by a triangular shape.
2. Breakaway steel sign posts will be by the pound, exclusive of galvanizing.
3. Breakaway wood sign posts will be by the 1000 foot board measure – MFBM, installed.
4. Sign brackets and brace angles will be by the pound, exclusive of galvanizing.
5. Breakaway steel sign post installation, including foundations, hardware, and breakaway base assembly, will be per each.
6. Overhead sign bridges, cantilever sign structures, and tee sign structures, including foundations, will be per each.

616.05 Basis of Payment. The Department will pay for acceptable quantities at the contract unit prices as follows:

Pay Item	Pay Unit
Signs, Type ____	SF
Breakaway Steel Sign Posts, Type ____.....	lb
Breakaway Wood Sign Posts, Type ____.....	MFBM
Sign Brackets and Brace Angles.....	lb
Breakaway Steel Sign Post Installation Type ____	Each
Overhead Sign Bridge, Cantilever Sign Structure, or Tee Sign Structure	Each

Covering and uncovering signs will be at no additional cost to the Department.

ON PAGE 399 - 400, SECTION 617 – DELINEATOR AND MILEPOST ASSEMBLIES *

Delete entire section and substitute the following:

SECTION 617 – DELINEATOR AND MILEPOST ASSEMBLIES

617.01 Description. Provide and install delineator and milepost assemblies.

617.02 Materials. Provide materials as specified in:

Non-Structural Concrete	509
Rigid Posts for Delineators, Snow Poles, and Mileposts	708.16
Sheet Aluminum	708.27
Retroreflective Sheeting.....	712.02
Silk Screen Opaque Inks.....	712.07
Silk Screen Transparent Inks	712.08
Flexible Posts for Delineators.....	712.10

Delineators may have rigid or flexible posts unless otherwise indicated. Use rigid posts if snow poles will be installed.

Use Class 30 Concrete.

617.03 Construction Requirements. Set delineators and mileposts plumb. Provide the Engineer with the manufacturer’s installation instructions if flexible delineator posts are used.

If the milepost location is within 50 ft of an established delineator, remove the delineator.

A. Delineator Assemblies. Delineator types 1, 2, 3, or 4 consist of a delineator post and a delineator.

Delineator types 5, 6, 7, or 8 consist of a stub post and a delineator for installation on concrete barrier.

Delineator type 9 assemblies vary in shape and may be attached to concrete barrier, to guardrail posts, or to w-beam guardrail. Attach in accordance with the manufacturer’s installation instructions. Provide the Engineer with the manufacturer’s instructions prior to installation.

Attach sheet aluminum with retroreflective sheeting to rigid posts. Attach retroreflective sheeting to flexible posts. Use Type IV or higher retroreflective sheeting.

B. Milepost Assembly. A milepost assembly consists of a concrete foundation, post, and milepost sign. If a pre-cast foundation is used, dig the foundation hole to a dimension larger than the concrete foundation and then backfill and tamp using Engineer approved material.

617.04 Method of Measurement. The Engineer will measure acceptably completed work per each.

617.05 Basis of Payment. The Department will pay for acceptable quantities at the contract unit prices as follows:

Pay Item	Pay Unit
Delineators, Type ____	Each
Mileposts, Type ____	Each

ON PAGE 402, SUBSECTION 618.03 – CONSTRUCTION REQUIREMENTS *

Delete the first paragraph

ON PAGE 411, SUBSECTION 621.02 – MATERIALS

Delete “Erosion Blankets . . . 711.11” and substitute “Rolled Erosion Control Product (RECP) ...711.11” and Turf Reinforced Mat (TRM) ...711.11A

ON PAGE 415, SUBSECTION 621.03 – CONSTRUCTION REQUIREMENTS

Delete Part F and substitute the following:

F-1. Rolled Erosion Control Products (RECP). Install RECPs on slopes in vertical direction and in accordance with the manufacturer's recommendations or as Engineer directed.

F-2. Turf Reinforced Mat (TRM). Install TRMs in accordance with the manufacturer's recommendations or as Engineer directed.

ON PAGE 416, SUBSECTION 621.04 – METHOD OF MEASUREMENT

Delete Part 6 and substitute the following:

6. Rolled Erosion Control Product and Turf Reinforced Mats will be by the square yard.

ON PAGE 416, SUBSECTION 621.05- BASIS OF PAYMENT

Delete the second pay item. (Seed ... Ac)

Delete the eleventh pay item. (Erosion Blanket ... SY) and substitute the following:

Rolled Erosion Control Products	SY
Turf Reinforced Mat	SY

ON PAGE 418 - 419, SECTION 624 – RIPRAP *

Delete this Section and substitute the following:

SECTION 624 – RIPRAP

624.01 Description. Provide and place riprap. The Department will specify riprap size and placing method.

624.02 Materials. Provide material as specified in:

Riprap.....711.04

624.03 Construction Requirements. When required, excavate the toe trench for riprap below probable scour elevation or to the elevation specified. Excavate the trench 2 ft below channel grade where scour elevation cannot be determined and no elevation is shown on the plans or as directed. Start by placing a course of the largest stones in the toe trench. Do not lay stone until the toe trench and slopes are Engineer approved. Place riprap so the larger stones are in contact with each other and the voids are filled with the finer materials, producing a well graded compact mass. Place the stone on the slope in a way that ensures the specified thickness in one operation. Do not disturb the underlying material when placing the riprap. Do not place in layers parallel to the slope.

624.04 Method of Measurement. The Engineer will measure acceptably completed work by the ton or cubic yard of riprap.

624.05 Basis of Payment. The Department will pay for the accepted quantity at the contract unit price as follows:

Pay Item	Pay Unit
Riprap.....	Ton or CY

The Department will pay for excavation of toe trenches below the level of the intersection of the slope to be riprapped and the adjacent final ground or channel floor as specified in 210.

Riprap/Erosion control geotextile, if used, will be paid for as specified in 640. Preparation of the slope to receive riprap above the level of the intersection of the slope to be riprapped and the adjacent final ground or channel floor is incidental and the cost included in the contract unit price for riprap items.

ON PAGE 420 - 426, SECTION 626 - TEMPORARY TRAFFIC CONTROL *

Delete this Section and substitute the following:

SECTION 626 - TEMPORARY TRAFFIC CONTROL

626.01 Description. Provide, install, and maintain temporary traffic control.

626.02 Materials. Provide material as specified in:

Signs and Sign Supports	616
Retroreflective Sheeting.....	712.02

Ensure that temporary traffic control devices are in acceptable or marginal conditions as defined in ATSSA’s Quality Guidelines for Temporary Traffic Control Devices & Features.

A. Construction Signs. Provide construction signs in accordance with 616.

- B. Channelizing Devices.** Provide portable tubular markers, vertical panels, drums, barricades, or other channelizing devices.

Provide portable tubular markers that are at least 36 in high and have at least 3 in width when facing traffic.

Provide barricades that have the following minimum lengths unless otherwise Engineer approved:

1. Type I - 2 ft
2. Type II - 2 ft
3. Type III - 7 ft

C. Temporary Markings. Provide removable retroreflective temporary pavement marking tape for use on concrete or asphalt pavements that is white or yellow, pre-coated with pressure sensitive adhesive, 4 in wide, and capable of conforming to the pavement surface.

D. Arrow Boards. Provide arrow boards with a meter that records hours of operation.

E. Temporary Flexible Raised Pavement Markers. Provide temporary flexible raised pavement markers. Provide two-sided markers when used on undivided highways. Install in accordance with manufacturers installation instructions.

F. Rigid Raised Pavement Markers. Provide reflectorized rigid raised pavement markers for temporary applications. Provide two-sided markers when used on undivided highways. Install in accordance with manufacturers installation instructions. Ensure that markers are removable without the use of heat, grinding, or blasting.

G. Miscellaneous Temporary Traffic Control Items. Provide miscellaneous temporary traffic control items that are Engineer approved.

H. Flagger Equipment. Ensure that flaggers wear high-visibility safety apparel and are provided a STOP/SLOW paddle.

I. Pilot Car. Provide a vehicle with a PILOT CAR FOLLOW ME sign mounted on the rear of the pilot vehicle. Show the company name of the pilot car contractor on both sides of the vehicle.

626.03 Construction Requirements. Do not use devices for purposes other than those for which it is intended. Cover or remove traffic control devices not currently necessary.

Ensure that temporary traffic control devices meet minimum retroreflectivity requirements. Repair or replace devices found to be damaged or defective.

Ensure that traffic control devices remain in place and serviceable during the time that their use is required. Provide supplemental devices to ensure that channelizing devices remain in place.

Maintain, relocate, clean, and repair damaged, inoperative, or unusable devices as Engineer determined. Install and remove Department furnished signs.

Install temporary markings as soon as practical on newly placed pavements. Repair damaged markings.

Use temporary raised pavement markers or raised pavement markers to supplement or as a substitution for other pavement markings. Use two markers placed side by side to mark double width lines. The Engineer may require additional markers placed at a reduced spacing.

Obtain Engineer approval before removing temporary traffic control. Return temporary traffic control devices provided by the Department to the Department.

Perform flagger control with certified flaggers. Certified flaggers have completed a flagger training course from a Department approved source and carry a current certificate of training. Certifications issued by other state Departments of Transportation that have a reciprocity agreement with the Department are acceptable.

626.04 Method of Measurement. The Engineer will measure acceptably completed work as follows:

1. Construction Signs will be by the square foot of sign.
2. Portable tubular markers, vertical panels, drums, and barricades will be per each.
3. Temporary Markings will be by the foot.
4. Arrow Boards will be by the hour.
5. Temporary Flexible Raised Pavement Markers will be per each.
6. Rigid Raised Pavement Markers will be per each.
7. Miscellaneous Traffic Control Items will be by the lump sum.
8. Traffic Control Maintenance will be by the hour.
9. Flagger control will be by the hour and is limited to the actual number of hours that flagging stations are staffed. If allowed by the Engineer, flagger control for the sole convenience of the contractor will be at no additional cost.
10. Pilot car operation will be by the hour.

Record the number of hours of traffic control maintenance, flagger control, or pilot car daily. Provide the records to the Engineer weekly for approval of hours claimed.

626.05 Basis of Payment. The Department will pay for accepted quantities at the contract unit prices as follows:

Pay Item	Pay Unit
Construction Signs	SF
Portable tubular Markers.....	Each
Vertical Panels	Each
Drums.....	Each
Barricade, Type ____.....	Each
Temporary Pavement Marking Tape	ft
Arrow Board, Type ____	Hour
Rigid Raised Pavement Markers.....	Each
Miscellaneous Temporary Traffic Control Items.....	Lump Sum
Traffic Control Maintenance.....	Hour
Flagger Control	Hour
Pilot Car	Hour
Temporary Flexible Raised Pavement Markers.....	Each

ON PAGE 437 - 438, SECTION 628 - SNOW POLES

*

Delete this Section and substitute the following:

SECTION 628 - SNOW POLES

628.01 Description. Provide and install snow poles.

628.02 Materials. Provide materials as specified in:

Rigid Posts for Delineators, Snow Poles, and Mileposts	708.16
Retroreflective Sheeting.....	712.02
Flexible Snow Poles.....	712.11

628.03 Construction Requirements. Install snow poles as follows:

- A. **Rigid Snow Poles.** Assemble rigid snow poles, delineator, and reflectors as shown on the plans.
- B. **Flexible Snow Poles.** Attach flexible snow pole to rigid delineator post and attach reflectors as shown on the plans and in accordance with manufacturer's recommendations.

628.04 Method of Measurement. The Engineer will measure acceptably completed work per each.

628.05 Basis of Payment. The Department will pay for accepted quantities at the contract unit price as follows:

Pay Item	Pay Unit
Snow Poles, Type _____	Each

The Department will not make separate payment for delineators where rigid snow poles are installed.

ON PAGE 439 - 440, SUBSECTION 630 – FLAGGING AND PILOT CARS *

Delete entire section.

ON PAGE 441, SUBSECTION 632.03 – CONSTRUCTION REQUIREMENTS

Add the following after the subsection heading:

Obtain Department approved concrete mix design for the new deck before starting deck removal.

ON PAGE 443 - 444, SECTION 634 - MAILBOX *

Delete entire section and substitute the following:

SECTION 634 - MAILBOX

634.01 Description. Remove the existing mailbox assembly and provide and install mailbox assembly.

634.02 Materials. Provide mailboxes that are approved by the Postmaster General.

Fabricate the platform, shelf, and brackets in accordance with ASTM A 568. Galvanize the supports, platform, shelf, locking wedges, anti-twist plates, bolts, bracket, nuts, screws, washers, and miscellaneous hardware as specified in ASTM A 153 Class C/D or ASTM B 695-Class 40.

Provide posts to be used as mailbox supports as shown on the plans and meeting the requirements of 708.16 and 710.02.

634.03 Construction Requirements. Remove the existing mailbox assembly and snow shield and return it to the owner. Provide and install a new mailbox assembly and mailbox snow shield as shown on the plans or as Engineer directed. Verify the number and size of mailbox, mailbox snow shield, and type of assembly before ordering. See Standard Drawing Notes for additional construction requirements for each specific mailbox assembly type and snow shield.

Place the name and address as shown on the existing mailbox on the new mailbox or as Engineer directed.

Maintain continuous access to mailbox and do not interrupt mail service. The Engineer may approve an acceptable temporary mailbox assembly installed during construction operations before the installation of the new mailbox assembly.

634.04 Method of Measurement. The Engineer will measure acceptably completed work as follows:

- 1. Mailbox will be per each, regardless of the type or size.
- 2. Mailbox Snow Shield will be per each.

634.05 Basis of Payment. The Department will pay for accepted quantities at the contract unit prices as follows:

Pay Item	Pay Unit
Mailbox.....	Each
Mailbox Snow Shield.....	Each

The Department considers post, platform, shelf, brackets, and other hardware incidental and the cost included in the contract unit price for Mailbox.

ON PAGE 450, SUBSECTION 656.02 – MATERIALS

Delete from the first paragraph the letter “B” after 40.

ON PAGE 460, SUBSECTION 702.06 - CONCRETE AGGREGATE

*

Delete AASHTO T 40 and substitute the following:

AASHTO R 66

ON PAGE 461 - 462, SUBSECTION 703.02- CONCRETE AGGREGATE

*

Delete the last paragraph on page 461 and the first paragraph on page 462 (retain Table 703-2) and substitute the following:

Perform AASHTO T 303, AASHTO TP 110 ASTM C1293 or ASTM C295 testing to determine the potential Alkali Silica Reactivity of the aggregates. The Department will require mitigating measures for aggregates found to be potentially reactive per AASHTO T 303, AASHTO TP 110, ASTM C1293, or ASTM C295. Potentially reactive aggregates are those with expansion greater than 0.10 percent as determined by AASHTO T 303, or greater than 0.04 percent as determined by ASTM C1293 or AASHTO TP 110. If ASTM C295 indicates an aggregate composition containing a percentage for any of the following materials greater than that shown in Table 703.02-2, the Engineer will consider the aggregate potentially reactive.

Include mitigation measures such as fly ash, lithium admixtures, or other material for Engineer approval. Submit test results from ASTM C1567, AASHTO TP 110 or CRD C 662 that demonstrate the proposed mitigation used with the cement and aggregates will control the potential expansion. Do not use an aggregate source for concrete before Engineer approval.

ON PAGE 462, SUBSECTION 703.02- CONCRETE AGGREGATE

Delete from Table 703.02-3 the Percent Passing the No.100 sieve “3-10” and substitute “2-10”.

ON PAGE 464 & 465, SUBSECTION 703.02- CONCRETE AGGREGATE

Delete the first paragraph of Part D and Table 703.02-8, retaining the heading and last three paragraphs and substitute the following:

As an option to using coarse and fine graded aggregates for concrete, aggregate gradation may consist of a combined gradation. Meet the material requirements for coarse and fine aggregates for concrete. Meet the following additional requirements:

**Table 703.02-8
Combined Aggregate Size No. and Gradation**

	1C	2C^{(a)(b)}	3C^{(a)(b)}	4C^{(a)(b)}	5C
Sieve size	INDIVIDUAL PERCENT RETAINED				
2 1/2in					0
2 in				0	0-10
1 1/2 in			0	0-10	4-18
1 in		0	0-10	4-18	6-20
3/4 in	0	0-10	4-18	6-20	6-20
1/2 in	0-10	4-18	6-20	6-20	6-20
3/8 in	5-18	6-20	6-20	6-20	6-20
No. 4	4-20	6-20	6-20	6-20	6-20
No. 8	4-20	0-16	0-16	0-16	0-16
No. 16	4-20	0-16	0-16	0-16	0-16
No 30	4-20	6-20	6-20	6-20	6-20
No. 50	4-20	6-20	6-20	6-20	6-20
No. 100	4-20	4-18	4-18	4-18	4-18
No. 200	0-6.0	0-6.0	0-6.0	0-6.0	0-6.0
pan	0-3.0	0-2.0	0-2.0	0-2.0	0-2.0

^a Total percent retained on the No.8 to No. 30 sieves shall be less than 24%

^b Total percent retained on the No. 30 sieves and below shall not be less than 24% or more than 34%

ON PAGE 466, SUBSECTION 703.04- AGGREGATE FOR UNTREATED BASE

Add the following footnote to table:

Percent Passing applies to all columns.

ON PAGE 468 - 470, SUBSECTION 703.05- AGGREGATE FOR SUPERPAVE HMA PAVEMENT

*

Delete this subsection and substitute the following:

703.05 Aggregate for Superpave HMA Pavement.

Provide aggregate for mixes, except SP 2, in a minimum of two separate stockpiles. Use aggregate consisting of crushed stone or crushed gravel. Combine with other required aggregate fractions and fillers, in proper proportion so the resulting mixture meets the gradation required for the specific class under contract.

Screen the aggregate used for Superpave HMA so that not more than 10 percent of the naturally occurring minus 1/2 in material remains in the material used to produce the stockpile(s). Crush the plus 1/2 in material thus produced to produce the required gradation. This requirement does not apply to SP 2 mixes or mixtures designated as non-structural or temporary mixtures.

Size, grade, and combine the fractions for the mixture in proportions so the resulting blend conforms to the grading requirements as defined in the Table 703.05-2.

Use aggregate that meets the requirements of Table 703.05-1.

Table 703.05-1 - Superpave Mixture Requirements

Mix Type	SP2	SP3	SP5
Design ESALs ^a (millions)	< 1	1 < 10	≥10
Idaho Degradation, maximum loss,%	5.0	5.0	5.0
Ethylene Glycol, minimum retained, %	90	90	90
R-Value	80 or more	80 or more	80 or more
LA Wear, Max % loss	35	30	30
Sodium Sulfate Soundness ^b Max loss after 5 cycles, %	12	12	12
Fractured Face, Coarse Aggregate ^c % Minimum,	65/-	75/60	98/98
Uncompacted Void Content of Fine Aggregate, % Min.	40	40	45
Sand Equivalent, Minimum	35	40	45
Flat and Elongated ^d , % Max.	10	10	10

a The anticipated project traffic level expected on the design lane over a 20-year period. Regardless of the actual design life of the roadway, determine the design ESALs for 20 years.

b Perform sodium sulfate soundness testing when requested by the Engineer.

c 75/60 denotes that 75 percent of the coarse aggregate has one fractured face and 60 percent has two or more fractured faces.

d This criterion does not apply to No. 4 nominal maximum size mixtures.

Table 703.05-2
Nominal Maximum Aggregate Size-control points (Percent Passing) and VMA Requirements PCS
Control points for Mixture nominal Maximum Aggregate Size **

Sieve Size	1-1/2 in.		1-in.		3/4 in.		1/2 in.		3/8 in.		#4
	Restricted Zone	Control Points									
2 in.											
1-1/2	90-10	100									
1 in.	90	*90-	100								
3/4 in.				90	*90-	100					
1/2 in.	*40-70				90	*90-	90	*90-	100		100
3/8 in.							*52-80	90	*90-	*90-	*95-
No. 4	34.7		39.5						90		90-100
No. 8	23.3	*15-41	26.8	*19-45	34.6	*23-49	39.1	*28-58	47.2	*32-67	
No. 16	15.5		18.1		23.1		25.6		31.6		*30-55
No. 30	11.7		13.6		16.7		19.1		23.5		
No. 50	10		11.4		13.7		15.5		18.7		
No. 100											
No. 200	*0.0-		*1.0-		*2.0-		*2.0-		*2.0-		*6.0-
VMA,	11.0		12.0		13.0		14.0		15.0		16.0
Primary Control Sieve	3/8"		No. 4		No. 4		No. 8		No. 8		No. 16
PCS Control Point (% passing)	47		40		47		39		47		42

Note: (*) denotes the sieves that will be used for mix design control points for all classes of mix and quality analysis sieves for a Class SP 2 mix. **The combined aggregate gradation shall be classified as coarse graded when it passes below the Primary Control Sieve (PCS) control point as defined in Table 703.05-2. all other gradations shall be classified as fine graded.)This classification is based on the Contractor Job Mix Formula and not individual gradation tests.) Coarse graded mixtures shall not pass through the restricted zone.

ON PAGE 471, SUBSECTION 703.08-AGGREGATE FOR OPEN GRADED ROCK (ROCK CAP)

Delete Subsection heading and substitute: **703.08-AGGREGATE FOR OPEN-GRADED BASE**

ON PAGE 473, SUBSECTION 703.09-AGGREGATE FOR EXTRUSIONS

Delete this Subsection.

ON PAGE 478, SUBSECTION 704.03-HOT POURED ELASTOMERIC TYPE CONCRETE JOINT SEALANT

Delete the first sentence and substitute the following;

Meet ASTM D 6690, Type III.

ON PAGE 485, SUBSECTION 706.19-POLYPROPYLENE PIPE

Delete the text of this subsection and substitute the following:

Meet ASTM F2736 or ASTM F2764, as applicable.

Add the following:

706.20 Fittings for Polyethylene Drainage Tubing. Meet ASTM F405

706.21 Rodent Protection Devices for Trench Drain Meet ASTM F449

ON PAGE 497, SUBSECTION 708.08 - H-BEAM PILES

*

Delete in the first sentence "ASTM A 36" and substitute "ASTM 572 Grade 50 or as shown in the plans"

ON PAGE 498, SUBSECTION 708.13 - CHAIN LINK FENCE

Delete from the first sentence "(3.05mm)" and substitute "(0.12 in)"

Delete Table 708.13-1 and the rest of the subsection and substitute the following:

Table 708.13-1					
Chain Link Posts And Braces					
Fence Height		Pipe Section		C-Section (Class does not apply)	
		Min Size		Min Size	Min Weight
		inch-od		inch	lb/ft
Line Posts					
≤6 ft		1.9		1.875 x 1.625	1.85
≤8 ft but > 6 ft		2.375		1.875 x 1.625	2.28
Corner and End Posts					

Table 708.13-1					
Chain Link Posts And Braces					
≤6 ft		2.375			
≤8 ft but > 6 ft		2.875			
Braces					
All Heights		1.660		1.625 x 1.25	1.35

Pipe lengths longer than those shown must comply with the weights relative to min O.D. shown in ASTM F1043, Group 1A or Group 1C. The Engineer will allow interpolation of the weights shown in ASTM F1043.

Pipe sections: Meet ASTM F1043, Group 1A or Group 1C.

Use either Group 1A or Group 1C posts and braces within the limits of the project.

Ensure C-Sections have minimum yield strength of 45,000 psi. Ensure coating of C-Sections are the same as Group 1A or Group 1C.

Provide tension wire 3/16 in diameter and 1.2 oz/ft² zinc coating. For fencing, fittings, and hardware meet AASHTO M 181.

ON PAGE 499, SUBSECTION 708.14 - GUARDRAILS AND FITTINGS

Delete this subsection and substitute the following:

708.14 Guardrails and Hardware. Provide galvanized beams for guardrail and terminals that meet AASHTO M-180, Class A, Type 2, except that galvanizing the rail occurs after fabrication, with fabrication to include forming, cutting, shearing, punching, drilling, bending, welding, and riveting. In addition, ensure the minimum average mass of zinc coating is 2 ounces per square foot of surface (not sheet). Galvanize splice plates in accordance with ASTM A 123. Galvanize anchor cables in accordance with AASHTO M30.

Provide bolts, nuts and washers used with guardrail in accordance with ASTM A 307 or A 325, except that rail splice bolts must be button headed. Provide galvanized bolts, nuts, washers and other hardware used with guardrail in accordance with ASTM A 153.

ON PAGE 499 - 500, SUBSECTION 708.15 – MILEPOST PLATES

*

Delete subsection and substitute "Not Used"

ON PAGE 500, SUBSECTION 708.16 – RIGID POSTS FOR DELINEATORS, SNOW POLES, AND MILEPOSTS

*

Delete subsection text and substitute the following:

1. Provide posts for delineators and snow poles weighing a 1.12 lb/ft and that meet ASTM A499. Galvanize per ASTM A123 or provide with green baked enamel finish.

2. Provide steel posts for mileposts that meet ASTM A1011, Grade 45 minimum, ASTM A653 G90, and ASTM A513.

ON PAGE 505, SUBSECTION 708.25 –ALUMINUM RAIL AND FITTINGS

Delete this subsection.

ON PAGE 505, SUBSECTION 708.27 – SHEET ALUMINUM

Delete this subsection and substitute the following:

708.27 Sheet Aluminum. Meet ASTM B 209, Alloy 6061-T6 or 5052-H38 with an alodine 1200 finish.

ON PAGE 506, SUBSECTION 709.01 – MEMBRANE-FORMING CURING COMPOUND

Delete the text of this subsection and substitute the following:

Meet:

System 1. ASTM C 309, Type 1-D, Class B with Fugitive Dye

System 2. ASTM C 309, Type 2, Class B, White Pigmented

ON PAGE 508, SUBSECTION 710.03 - WOOD GUARDRAIL POSTS AND WOOD SPACER BLOCKS

Delete the title and substitute "Wood Guardrail Posts and Wood Blockouts"

Delete "spacer blocks" at the end of the first sentence and substitute "blockouts".

In the first sentence of the second paragraph, Delete the word "blocks" and substitute "blockouts".

ON PAGE 511, SUBSECTION 710.09 -PRESERVATIVE TREATMENT

Delete from the first sentence "block spacers" and substitute "blockouts"

Delete the title of Table 710.09-2 and substitute "Guardrail Posts and Blockouts"

ON PAGE 512, SUBSECTION 711.04 – RIPRAP

*

Delete this subsection and substitute the following:

711.04 Riprap. Material for riprap consists of natural or quarry stones from an approved source, which are durable, angular, sound, hard, free from seams and other structural defects, resistant to weathering and water action, and meet all the testing requirements of either set of criteria in Table 711.04-1.

**Table 711.04-1
Rip Rap Quality Testing Criteria**

Non-approved Source			Approved Source		
Property	Test Method	Requirement	Property	Test Method	Requirement
Apparent Specific Gravity	AASHTO T 85	2.5 Min	Idaho Degradation	Idaho T 15	8% Max Loss

**Table 711.04-1
Rip Rap Quality Testing Criteria**

Non-approved Source			Approved Source		
Property	Test Method	Requirement	Property	Test Method	Requirement
Absorption	AASHTO T 85	4 % Max	Los Angeles Abrasion	AASHTO T 96	40% Max
Coarse Durability Index	AASHTO T 210	52 Min	Ethylene Glycol	Idaho T 116	90% Min Retained

ON PAGE 516 & 517, SUBSECTION 711.11 – EROSION BLANKETS

Delete this subsection and substitute the following:

711.11 Rolled Erosion Control Products (RECP). Provide RECP in pre-manufactured rolls. Ensure RECPs are certified “noxious weed free” in the State of Idaho by an authorized (or approved) State Agency.

Ensure compliance with the specifications for Rolled Erosion Control Products as outlined by the Erosion Control Technology Council (ECTC).

For other RECPs provide certification from the manufacturer that the materials are nontoxic to animals, soil microorganisms, aquatic and plant life, and will not interfere with or impede seed germination or vegetative growth and establishment.

Provide RECPs that are made from 100% biodegradable materials. Ensure material, including netting, has a life expectancy of approximately one year.

711.11A, Turf Reinforcement Mats (TRM). Provide certification from the manufacturer that materials are non-toxic to animals, soil microorganisms, aquatic and plant life and will not interfere or impede seed germination or vegetative growth and establishment.

ON PAGE 519, SUBSECTION 712.01 - PLYWOOD FOR TYPE E SIGNS

Delete the text of this subsection and substitute the following:

Meet U.S. Product Standard for Construction and Industrial Plywood.

ON PAGE 519, SUBSECTION 712.02 – REFLECTIVE SHEETING

*

Delete this subsection and substitute the following:

712.02 Retroreflective Sheeting.

Supply retroreflective sign sheeting meeting ASTM D4956 standards for classification, color and performance.

1. **Sheet Aluminum and Plywood Signs** - Provide Type IX (minimum) direct applied retroreflective sheeting. If legend is retroreflective it must be of the same “Type” as the background sheeting.
2. **Extruded Aluminum Sign Panels** - Provide Type IX (minimum) direct applied retroreflective sheeting for the background and legend.

3. **Temporary Traffic Control Devices** - Provide Type IV (minimum) direct applied retroreflective sheeting.
4. **Delineators and Snow Pole Reflectors** – Provide Type IV (minimum) direct applied retroreflective sheeting.

ON PAGE 520 - 521, SUBSECTION 712.04 – REFLECTOR UNIT FOR DELINEATORS *

Delete subsection and substitute "Not Used"

ON PAGE 521 - 522, SUBSECTION 712.10- FLEXIBLE POST DELINEATORS *

Delete this subsection and substitute the following:

712.10 Flexible Posts for Delineators. Provide flexible posts for delineators as follows:

1. White unless otherwise specified.
2. Drivable with a steel stub or sleeve.
3. Flexible, non-warping, non-metallic, durable composite material.
4. Resistant to damage due to impact, ultraviolet light, ozone, hydrocarbons and other effects of atmospheric weathering.
5. Resistant to overturning, twisting, displacement from wind and impact forces.
6. Retain flexibility for a designed minimum life equaling 60 months of outdoor service.

ON PAGE 523 & 524, SUBSECTION 713.06– COMPOSITE JUNCTION BOXES

Delete this subsection and substitute the following:

713.06 Composite Junction Boxes. Provide composite junction boxes meeting the following requirements;

1. Polymer concrete, reinforced by a fiberglass weave.
2. Constructed bottomless.
3. Non-deliberate traffic junction boxes and covers tested and certified to the provisions of the ANSI/SCTE 77 2010, by a nationally recognized third party independent test firm such as UL (Underwriters Laboratories) or ETL (Intertek) testing services.
4. One year minimum manufacturer’s warranty.
5. Non-deliberate traffic junction box covers rated for a Tier 22 application. Emboss Tier 22 rating in the top surface of the cover.
6. Secure cover to junction box using stainless steel hex head with self-cleaning threads. (Example: Coil bolt or $\frac{3}{8}$ -7 lag thread.
7. Type PGD junction box is to have a two piece box cover.
8. Embed a “General Purpose” EMS marker in the junction box cover.
9. Mold logos in the junction box cover.
10. A minimum applied force of 2,000 pound rating for the pull slots.
11. Color junction boxes and covers concrete gray.

Size junction boxes as follows:

Size “PGB” nominal inside dimensions of 11 ½ in x 21¼ in x 16 in deep.

Size “PGC” nominal inside dimensions of 15½ in x 28½ in x 16 in deep.

Size “PGD” nominal inside dimensions of 20¾ in x 29¾ in x 22 in deep.

ON PAGE 525, SUBSECTION 713.08– SIGNAL POLES

Delete from 713.08.A.2 “20 ft.” and substitute “15 ft.”

Delete the entire first 713.08.A.4 and substitute the following:

- 3A. Use current Department approved signal pole designs.

ON PAGE 527, SUBSECTION 713.09– LUMINAIRE POLES

Delete the entire 713.09.A.3 and substitute the following:

3. Use current Department approved luminaire pole designs.

ON PAGE 531, SUBSECTION 714.02- FLYASH

Delete the third paragraph and substitute the following:

When fly ash is used as a mineral admixture, use fly ash meeting the class F requirements with a maximum CaO limit of 15 percent. The Engineer will not apply the available alkalies limits.

ON PAGE 536, SUBSECTION 718.05- DRAINAGE GEOTEXTILE PROPERTY REQUIREMENTS

Correct the heading of the last two columns of Table 718.05-1 to read:

Minimum Average Roll Values
(in weaker principal direction)

In Table 718.05-1 add the value of Grab Elongation, (%) for Type II of NA.

In Table 718.05-1 add the value of Apparent Opening Size (AOS) (Std. Sieve) for Type II of “#70 or Finer”

ON PAGE 537, SUBSECTION 718.06- RIPRAP/EROSION CONTROL GEOTEXTILE PROPERTY REQUIREMENTS

In Table 718.06-1 the values where columns are blank shall be the same requirement shown under Type I.

ON PAGE 538, SUBSECTION 718.07- SUBGRADE SEPARATION GEOTEXTILE PROPERTY REQUIREMENTS

In Table 718.07-1 delete the value of Apparent Opening Size (AOS) (Std. Sieve) for Type II of “#70 or Finer” and substitute “#30 or Finer” under Type II “ and “#70 or Finer” under Type III.

ON PAGE 541, SUBSECTION 720.07- RECYCLED ASPHALT PAVEMENT

*

Add the following after the first paragraph:

Prepare and maintain a RAP processing and stockpiling Quality Control plan and make these records available to the Department .

Add after the first sentence of first paragraph in Category 2:

Produce uniform RAP stockpiles when Category 2 material originates from different sources.

Delete “720.07C” and substitute “720.07 3”

ON PAGE 544, SUBSECTION 720.07- RECYCLED ASPHALT PAVEMENT

*

Delete Table 405.02-1 and substitute Table 703.05-1 in the first paragraph of part 3.